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## EDITORIAL

**International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE)** is an open access international peer-reviewed, open-access journal, which provides a platform for highlighting and discussing various cognitive science issues dealing with the problems of cognition (and its evolution) within some specific subject field - philosophical, psychological, linguistic, mathematical, psychogenetic, pedagogical, ergonomic. Editorial Board strives to provide a possibility for the scientists of different fields to publish the results of their research, technical and theoretical studies. IJCRSEE is multidisciplinary in approach, and will publish a great range of papers: reports of qualitative case studies, quantitative experiments and surveys, mixed method studies, action researches, meta-analyses, discussions of conceptual and methodological issues, etc. IJCRSEE publisher is The Association for the Development of Science, Engineering and Education, Vranje, Serbia. Quality control, assisting and monitoring are supported by co-publishers:

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IJCRSEE particularly welcomes articles on the results of scientific research in various fields of cognitive science (psychology, artificial intelligence, linguistics, philosophy and neuroscience) catering for international and multidisciplinary audience. Readers include those in cognitive psychology, special education, education, adult education, educational psychology, school psychology, speech and language, and public policy. IJCRSEE has regular sections: Original Research, Review Articles, Studies and articles, Book Reviews, Case Studies, and is published 3 issues per year (April, August and December). This journal provides an immediate open access to its contents, which makes research results available to the public based on the global exchange of knowledge. The journal also offers access to uncorrected and corrected proofs of articles before they are published.

The main **aim** of the Journal is to discuss global prospects and innovations concerning major issues of cognitive science, to publish new scientific results of cognitive science research, including the studies of cognitive processes, emotions, perception, memory, thinking, problem solving, planning, education and teaching, language and consciousness study, the results of studying man's cognitive development and the formation of basic cognitive skills in everyday life. The Journal seeks to stimulate the initiation of new research and ideas in cognitive science for the purpose of integration and interaction of international specialists in the development of cognitive science as interdisciplinary knowledge.

All articles are published in English and undergo a peer-review process.

The **scope** of IJCRSEE is focused on cognitive research both in topics covered as well as disciplinary perspective:

- Cognitive Research in Education
- Cognitive Pedagogics
- Cognitive Psychology
- Psycholinguistics
- Cognitive Linguistics
- Cognitive Culture Studies
- Cognitive Neurophysiology
- Cognitive Aspects: Sport Culture
- Cognitive Aspects: Methodology of Knowledge

- Text Processing and Cognitive Technologies
- Educational technology

IJCRSEE has an international editorial board of eminent experts in their field from Russia, USA, Republic of Macedonia, Germany, Hong Kong, Greece, Serbia, Australia, United Kingdom, USA, Turkey, Nigeria, Bulgaria, Romania, Spain, Italy, Republic of Srpska, Croatia, Kingdom of Saudi Arabia (KSA), India, China, Thailand, Israel, Malaysia, Morocco, Jordan,, Iran... We are confident that IJCRSEE will attract a great number of editors, eminent scientists in the field. The selection will be based on the activities of the editors and their desire to contribute to the development of the journal.

IJCRSEE provides a platform for academics and scientists professionals to refer and discuss recent progress in the fields of their interests. Authors are encouraged to contribute articles which are not published or not under review in any other journal.

Each submitted manuscript is evaluated on the following basis: the originality of its contribution to the field of scholarly publishing, the soundness of its theory and methodology, the coherence of its analysis, its availability to readers (grammar and style). Normal turn-around time for the evaluation of manuscripts is one to two months from the date of receipt.

Submission of an original manuscript to the journal will be taken to mean that it represents original work not previously published, that is not being considered elsewhere for publication; that the author is willing to assign the copyright to the journal as per a contract that will be sent to the author just prior to the publication and, if accepted, it will be published in print and online and it will not be published elsewhere in the same form, for commercial purposes, in any language, without the consent of the publisher.

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Manuscripts must be submitted online. Electronic submission reduces the editorial processing and reviewing time. As part of the submission process, authors are required to check off their submission compliance with all of the following items, and submissions may be returned to authors who do not adhere to the following guidelines:

The submission has not been previously published or presented to another journal for consideration (or an explanation has been provided in Comments to the Editor).

The submission file is in OpenOffice, Microsoft Word, RTF, or WordPerfect document file format.

Where available, URLs for the references have been provided.

The text is single-spaced; uses a 12-point font; employs italics, rather than underlining (except with URL addresses); and all illustrations, figures, and tables are placed within the text at the appropriate points, rather than at the end.

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A manuscript goes through the peer review process. Authors submit manuscripts to



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Based on the reviewers' comments the Chief Editor makes a decision to:

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- Accept after revision
- Ask authors to resubmit
- Reject

An acceptance letter is sent to the author and the final manuscript is forwarded to production. Sometimes, the authors are requested to revise in accordance with reviewers' comments and submit the updated version or their manuscript to the Chief Editor. The time for review can be set to 2-8 weeks depending on the discipline and type of additional data, information or argument required. The authors are requested to make substantial revisions to their manuscripts and resubmit for a new evaluation. A rejection letter is sent to the author and the manuscript is archived. Reviewers might be informed about the decision.

After review a manuscript goes to the Copy Editor who will correct the manuscript concerning the correct referencing system, confirmation with the journal style and layout. When Copy Editor finishes his/her work they send manuscripts to the Layout editor.

Layout Editor is responsible for structuring the original manuscript, including figures and tables, into an article, activating necessary links and preparing the manuscript in the various formats, in our case PDF and HTML format. When Layout Editor finishes his/her job they send manuscripts to Proof Editor.

Proof Editor confirms that the manuscript has gone through all the stages and can be published.

This issue has 10 articles (8 original research and 2 review article). Our future plan is to increase the number of quality research papers from all fields of cognitive research in science, engineering and education. The editors seek to publish articles from a wide variety of academic disciplines and substantive fields; they are looking forward to substantial improvement of educational processes and outcomes.

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# STUDENTS' EMOTIONAL LITERACY IN THE DISCOURSE OF THE CONTEMPORARY SCHOOL IN SERBIA

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## ABSTRACT

The results of the research on the emotional literacy of students are presented in this paper. The primary goal of the research was to examine the general level and characteristics of the emotional literacy profile. The secondary goal was to determine the similarities and differences in levels of emotional literacy between pupils in relation to their gender and age. "Emotional awareness questionnaire" was used on the sample of 335 students of both sexes and two age groups (primary school pupils aged 14-15 years and high school students of 18-19 year). The research was descriptive, non-experimental and exploratory. The data obtained by the study were analyzed using the statistical package SPSS. The results of statistical descriptions of the empirical profile suggest that the general level of students' emotional literacy can be classified as average. Analyses of differences related to gender and age on individual profile components, showed that the gender differences were statistically significant ( $p < .001$ ) on all components ("emotional numbness," "empathy" and "interactivity"), while age differences were significant on the components: "differentiation of emotions" and "empathy" ( $p < .001$ ). The obtained findings were discussed in the context of the starting reference model of research. Recommended and needed future steps are the pedagogical monitoring of emotional development of young people, systematic influence on the development of their emotional competences and a far more active role of the school in the development of the emotional literacy of both students and teachers.

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## 1. INTRODUCTION

The question of the affective dimensions of the educational process and the emotional literacy of pupils and teachers is a topic that contemporary education was focused on only in recent years.

Before this, the approach to emotions in an educational context could be labeled as "emotionally blind", although it has long been known that emotions are factors that influence

the overall functioning of a person, and have an important, often crucial, role in interpersonal relations, motivation and learning. As early as 1930s, [Vygotsky \(1986\)](#) has stated in his learning theory that emotions have key roles in employing cognitive skills, learning and development process. Social and emotional factors have wide range of impacts from motivation for learning, remembering previously learnt knowledge and skills to logical thought ([Elias, 2006](#); [Oksuz, 2016](#); [Park, 1999](#)).

In recent years, many authors have contributed with their work to clearer understanding of the importance of emotional competences for the level of life success and well-being of man. However, the strongest impact on the (re)affirmation of emotion research in all academic areas, has been achieved by research in the field of neuroscience ([Immordino-Yang, 2011](#); [Immordino-Yang and Damasio, 2011](#)).

Concerning the promotion of the "emo-

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tional concept” in teaching and learning, the merits are most often attributed to Goleman and his, already famous point of view, according to which emotional competences are not inborn, but can be learned; they are developed through experiences and can be developed, practiced and learned, like any other subject (Goleman, 2006).

New psychological literature offers more models and theories of emotional intelligence (Ability model, Trait model, Mixed model).

These models differ in their conceptualization and operationalization of key terms, as well as in the way they study and measure these terms. Therefore, Park (1999) considers it desirable to first disclose the differences between the related, most frequently used constructs: emotional intelligence and literacy.

Emotional intelligence is a potential (predisposition) for emotional fluency, while emotional literacy represents the constellation of skills, strategies and tools that we adopt and develop to become truly emotionally fluent (Bocchino, 1999). Park, 1999 states that emotional literacy is the ability to recognize one's own and others' emotions, and to react accordingly. Steiner (2003), widely accepted as the author of the term “emotional literacy”, states that an emotionally literate person is able to become aware of their own feelings, whether they are pleasant or unpleasant, and acts in accordance with this knowledge. Therefore, person's perceptions and awareness of their own emotional experience is the central focus on which studies of emotional literacy are directed, as can be concluded from the understanding of the above mentioned and other authors (Orbach, 2000; Park, 1999; Steiner, 2003).

In addition to defining and operationalizing the emotional literacy construct, the second, essentially important question, are the characteristics and possibilities for its development. The belief that emotional literacy can be developed and taught at every age is widely represented in the emergence of the various applicative programs concerning emotional literacy, that are increasingly diverse and numerous worldwide.

Even though the belief that the possibilities for the development of emotional literacy are not limited by age has its foothold in empirical research, it is still considered that learning is best started in childhood (Figueroa-Sánchez, 2008), as is the case with most other skills such as reading, writing, learning foreign languages, sports... In the context of education, this position is important in various

aspects because, according to Steiner (2003), humans start to define their life attitudes early in life and emotional habits depend on them and therefore will very likely accompany the person during her entire life.

The strong influence of the emotional experience on all human activities, and the fact that it plays a significant role in the educational process, not only in actual achievement and learning, but also in the lifelong learning, is documented by many review, systematic and critical studies, meta-analysis and by a large number of empirical quantitative and qualitative researches (Buljubašić-Kuzmanović, 2008; Durlak, Weissberg, Dymnicki, Taylor, and Schellinger, 2011; Elias, 2006; Humphrey, Curran, Morris, Farell, and Woods, 2007; Wells, Barlow and Stewart-Brown, 2003; Zins, Bloodworth, Weissberg, and Walberg, 2004; Zins and Elias, 2006).

In empirical studies, socio-emotional aspects of the family and school environment, interactions with parents, peers, and teachers are the most examined factors in correlation to academic achievement. Recent researches are more focused on the school climate and the specific aspects of the socio-cultural environment of growing up, such as the number of family members, educational style... and their impact on prosocial behavior, willingness to learn and learning ability, sense of security in the school environment, self-actualization, life values and student attitudes (Jennings and Greenberg, 2009; Stepanović and Đermanov, 2015).

Although these studies examine various socio-emotional aspects in relation to different educational outcomes, their findings consistently point to a general pedagogical, developmental-psychological, theoretical postulate that a child can successfully participate in the educational process only when his or her basic needs (in this case the need to express, articulate and regulate emotions), are adequately met (Schutz and Lanehart, 2002). A number of authors point out that it is quite certain that emotions have an impact on learning of cognitive content in schools. These authors argue that emotions are embedded in a series of cognitive processes that are part of the learning process, of attention, memory, decision making, motivation and social functioning, and that rational logical thinking deprived of emotions cannot be adequately used in the real world (Immordino-Yang and Damasio, 2011; Tošić Radev, and Pešikan, 2017).

The latest research into affective dimensions of education provides plenty of evidence

that the experience of academic (non)success is directly and indirectly related to socio-emotional experiences at school: to the feeling of acceptance or rejection by teachers, peers, isolation experience and various other forms of emotional stress; and that the frequent negative emotional experiences increase the risk of generalized failure, lead to school absenteeism, juvenile delinquency and other problems in dealing with difficulties during life (Zins et al, 2004).

On the other hand, although teachers are aware of the variety of feelings of comfort and discomfort, which accompany their everyday work in the classroom, many experts warn that this field is still not understood adequately. There is a need for the teachers to recognize the connection of their own feelings and emotional competences with the pedagogical climate that they create in the classroom, their work style and the leadership and support they provide to students (Suzić, 2002; Perry and Ball, 2007; Jennings and Greenberg, 2009; Golub and Boháč, 2015).

However, all these findings are slowly and very selectively applied in our educational practice. Emotions in school (in teaching) are still a controversial subject, whose "power" can be productively "used" and unfortunately "abused". The contemporary living conditions put both the teachers and the students in the position to face ever increasing and diversifying challenges, such as accelerated technological development, increasing insecurity and frustration and changes in the field of work. All this changes demand different approaches to education and different concepts of literacy from those of the 20<sup>th</sup> century (Elias, 2006; Djermanov et al, 2015).

Our research is a contribution for the initial analysis of the level of emotional literacy of students in our country. Our motivation was the intention to contribute to a better understanding of the pedagogical and social importance of the affective dimension of education in the discourse of contemporary school through this research.

## 2. MATERIALS AND METHODS

### 2.1. Research Topic and Purpose

The topics of this research are the characteristics and levels of students' emotional literacy. The research is based on the Claude Steiner's theoretical model of emotional literacy (2003). The aim of the research was to identify the characteristics of the emotional

literacy profile of students related to their sex and age. This aim is concretized through three objectives: (1) To test the level of students' emotional literacy based on profile components from the theoretical model; (2) To examine the differences between the levels of emotional literacy based on the sex of the students; (3) Determine the differences between the levels of emotional literacy based on the age of the students.

### 2.2. Research Methods and Techniques

Descriptive research method and a structured questionnaire survey have been used in this research. "Emotional awareness questionnaire" was used for gathering the data (Steiner, 2003). This instrument is comprised of six subscales; emotional numbness; physical sensations, chaotic primal experience; differentiation of emotions; empathy and interactivity. Emotional awareness was an indicator of the operationalization of literacy components.

Each subscale has six statements (36 items in total) with three response modes (Yes - No - Not Sure). Only positive answers are scored.

The profile of emotional awareness for each examinee was constructed on the basis of partial scores on subscales. According to the typology of the theoretical model, empirical profiles were classified into: profile of low, average and high level of emotional awareness. This research has used four of the six scales in the original instrument: *emotional numbness scale* (EN); *differentiation of emotions* (DF); *empathy* (EM) and *interactivity* (IA). This instrument has been translated into Serbian language in 2007, as a part of the Steiners' study: „*Emotional Literacy; Intelligence with a Heart*“.

### 2.3. Research Sample

The research was conducted on a sample of two age groups of students, both sexes, in the urban environment (N=335). The sample consisted of 335 students, of which 164 were primary school pupils, 14-15 years of age, and 171 were grammar school students, aged 17-18 years. The distribution of examinees by sex was: 146 male and 189 female. The examinees were students of two primary and two secondary schools in Novi Sad in the Republic of Serbia.

**Table 1.** Sample of the Research

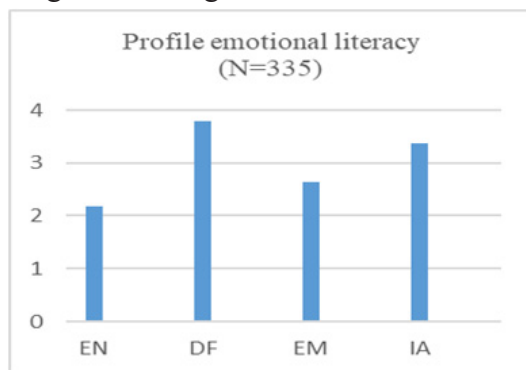
Age of children	Sex of children	N	$\Sigma$
Primary school	Male	75	164
	Female	79	
Secondary school	Male	71	171
	Female	100	
Age of children Primary & Secondary	Male	141	335
	Female	189	

## 2.4. Statistical data processing

Data analysis: After the carried out research, the data were prepared for the statistical analysis. SPSS Program was used for quantitative data processing in order to perform statistical calculations of measures and procedures in the field of descriptive statistics and inferential statistics (frequency, arithmetic mean, standard deviation, t-test to test the significance of differences between independent groups of respondents).

## 3. RESULTS

The first task of the research was focused on the level of emotional consciousness of students (emotional literacy). The level of emotional consciousness implicitly indicated the level of emotional literacy as well, because it could not be directly measured, but indirectly through measuring emotional consciousness.



**Figure 1.** Students' emotional literacy profile

Based on descriptive result indicators (frequency, average values and partial scores on subscales), we obtained the empirical profile of students' emotional literacy (Figure 1). The profile has characteristics of the theoretical profile of the average level of emotional awareness (Steiner, 2003), which means that examinees aged 14-19, both sexes, exhibit an

average level of emotional literacy.

## 3.1. The differences of Emotional literacy according to the sex

Results of the analysis of components of the emotional literacy profile (awareness) based on the sex of the examinees (Table 2) show that differences are statistically significant ( $p < 0.01$ ) in three of the four observed components.

**Table 2.** Emotional consciousness: Significant differences according to the sex

Components Scale	Sex	M	SD	t-test value	p
EN	Male	2.60	1.27	6.22	.00
	Female	1.81	1.05		
DF	Male	3.59	1.31	- 2.58	.01
	Female	3.96	1.32		
EM	Male	2.55	1.37	- .93	.35
	Female	2.69	1.32		
IA	Male	3.14	1.57	- 2.87	.00
	Female	3.60	1.32		

Results (Table 2) were additionally analyzed and interpreted on the subscales of emotional numbness (EO), differentiation of emotions (DE), empathy (EM) and interactivity (IN).

### 3.1.1. Differences in the level of emotional numbness (EN) in relation to the sex

Emotional numbness (EN) is at the very end of the scale of emotional literacy and marks a low emotional awareness.

A high score on this scale is manifested by the absence of emotional reactions, feelings of emptiness, exhaustion, and confusion. People with extremely high results are usually not aware of their emotions. Emotions are "frozen" and inaccessible for consciousness.

Our results on this scale (EN) show that girls generally have significantly lower scores than boys and that these differences are statistically significant ( $p < 0.01$ ). A relatively high score among the male examinees ( $M=2.60$ ;  $SD=1.27$ ) on the scale of emotional numbness, is additionally analyzed through the content of individual passages on this scale. The results of our analysis reveal the alarming fact that 50% of boys have affirmatively answered questions such as: 'I can easily kill a small animal, such as a snake or a chicken, and at



the same time “I do not feel anything special” or “I can be around people who feel physical pain, and that does not upset me”, as well as the statement “I cry extremely rarely”, where more than 90% of boys responded affirmatively. The latter could be interpreted in the light of our patriarchal upbringing that “teaches” male children to be strong and not to show their emotions. That was the reason for cold and apparent “superhuman” strength in their responses. It was obvious that male children continued to carry a huge emotional burden, which they should keep to themselves, as they were taught.

### **3.1.2. Differences in the level of differentiation of emotions (DF) in relation to the sex**

The second component of the “differentiation of emotions” refers to the recognition and interpretation of one’s own and other’s emotions. The level of differentiation of emotions shows how much a person is aware of their feelings, whether he or she knows how to recognize them and to determine their intensity, to think about them and to talk with other people about them. Generally speaking, the differentiation of emotions allows regulation, control and adequate expression of emotions. People with a high degree of emotional awareness achieve a high score on this component. Our results on the scale of differentiation show that the examinees of both sexes have very high scores and that girls show a higher degree of differentiation of emotions (Female,  $M=3.96$ ,  $SD=1.32$ ; Male,  $M=3.59$ ,  $SD=1.31$ ).

The difference is statistically significant ( $p < 0.01$ ). This data suggests that girls in general have a higher level of “emotional literacy” than boys, since the component of the differentiation of emotions is crucial for the development of higher levels of emotional awareness.

### **3.1.3. Differences in the level of empathy (EM) in relation to the sex**

The third analyzed component is “Empathy”. Empathy is a specific kind of intuition and it is exclusively related to emotions. Its basic characteristic is the emotional vicarious experience of another person’s feelings. It differs from compassion in that compassion is a mental, and empathy is an emotional process. A high score at the empathy scale indicates a

high level of emotional awareness.

In order to be able to develop empathy, a person needs a high ability to differentiate his or her own emotions, so that he or she could share the emotions of others. Our research has not shown the significant differences in the empathy (EM) levels by sex (Table 2).

Although the examinees have a high score on the differentiation of emotions scale, both sexes report a relatively low level of empathy (Male,  $M=2.55$ ,  $SD=1.37$ ; Female,  $M=2.66$ ,  $SD=1.32$ ).

### **3.1.4. Sex differences in degree of interaction (IA)**

Fourth component is the “emotional interactivity” (IA). Steiner (2003) says it is “the most sophisticated level of consciousness” (p.48). It is shown through the way of reacting to emotions and understanding the emotional exchanges between people.

Emotional interactivity requires a high level of awareness of one’s own and other people’s emotions, the estimation of how different emotions affect each other, and the awareness that the interaction of different emotions affects the intensity, dynamics and development of new ones. Interactivity is at the top of Steiner’s (2003) scale of emotional awareness, but he does not exclude the possible existence of another component, closer to the full awareness.

Our results (Table 2) show that the examinees of both sexes have high values on this component (Female,  $M=3.60$ ,  $SD=1.32$ ; Male,  $M=3.14$ ,  $SD=1.57$ ). The differences by sex are statistically significant ( $p < .00$ ) and higher among the female examinees.

The data concerning the high scores on this scale, for both groups of examinees and relatively low scores on the empathy scale, motivated us to analyze in more detail the answers on the individual items of the scale. Content analysis of the following items: “*People appreciate me because I calm down the situations when the emotions are heated.*”; “*I help people to understand and differentiate their emotions and I’m good at it because I usually understand why they feel them.*” “*When I’m in a room full of people, I can recognize the feelings of that group - excitement, anger, boredom or fear*”, suggests a possible reason for this unexpected result. We think that students were more focused to their own “I” or “me” position, rather than the content of the state-

ment itself (I help others, I can understand, people appreciate me). The striking similarity in the scores of differentiation and interactivity scales, on the one hand, and the low scores on the empathy scale, on the other hand, suggests several possible reasons for these results, from the question of the content validity of the scale for this age at which it was applied to the insufficient self-criticism of adolescents in assessing their own competencies at the interactive scale items.

Differentiation of emotions is necessary, but not sufficient for interactivity. It implies the capacity and the desire to truly understand the emotions of others, which our examinees manifest at a relatively low level. This indicates the need for further research in order to clarify this result.

### 3.2. Emotional literacy in relation to years of age and the level of education

Differences in the components of emotional literacy were also analyzed in comparison with the age of the examinees.

The results given in (Table 3) show interesting results. The scores on the emotional numbness scale (EN) and interaction scale (IA) of younger and older examinees are mutually similar and their scores concerning the scales of emotion differentiation (DF) and empathy (EM) are statistically significantly different.

**Table 3.** Differences in the level of emotional literacy in relation to the age

Components Scale	School	M	SD	t-test value	p
EN	Primary	2.19	1.14	.55	.58
	Secondary	2.12	1.28		
DF	Primary	3.62	1.29	- 2.44	.01
	Secondary	3.97	1.33		
EM	Primary	2.89	1.39	3.46	.00
	Secondary	2.39	1.25		
IA	Primary	3.41	1.49	.13	.89
	Secondary	3.39	1.41		

This direction in the differences between ages is interesting for further analysis. Older students generally have higher scores on the scale of differentiation, and younger students have higher scores on the scale of empathy. In both cases differences are statistically significant ( $p < 0.01$ ).

### 3.2.1. Differences in the level of emotional numbness (EN) in relation to the level of education

The average values on the scale (EN) for both ages (Table 3) show that older students achieve slightly lower results on the scale (EN) and that this difference is not statistically significant. These data, together with the data about sex differences on the same scale, imply that a traditional “emotional pattern” - the suppression of emotions among boys - basically does not change with age. These data show that the reason for this phenomenon is not developmental, but based on cultural and educational factors active in childhood and evidently difficult to change.

### 3.2.2. Differences in the level of differentiation of emotions (EN) in relation to the age

On the scale of differentiation of emotions (DF), students of both ages achieved high scores (Table 3). The obtained data – that the results of older students are higher ( $M=3.97$ ,  $SD=1.33$ ), and that the differences between ages are statistically significant ( $p < 0.00$ ) - speaks in favor of the development of this component of emotional literacy with the age of students. When we interconnect the results of this component, given the significance of sex and age differences, it can be concluded that the differentiation of emotions is the highest among girls at secondary school age, and the lowest among boys of elementary school age. By comparing the values for subgroups within the sex and age variables (Secondary,  $M=3.97$ ,  $SD=1.33$ ; Female,  $M=3.96$ ,  $SD=1.32$ ), we can see that for the recognition and interpretation of one's own and other people's emotions, the key factor is the age, although the sex differences are important.

### 3.2.3. Differences in the level of empathy in relation to the age

On the empathy scale (Table 3), age differences are statistically significant ( $p < 0.01$ ) in favor of younger students. The fact that younger students are significantly more empathic than the older students was unexpected and it is one of the most interesting findings of this research. This finding should also be checked on a representative sample to deter-

mine whether it is a possible systematic trend, or an artifact, generated by some other reason, for example by the sample on which the survey was conducted.

### 3.2.4. Differences in the level of interaction in relation to the age

On the scale of emotional interaction (Table 3), the difference between primary and secondary school students was not observed (Primary,  $M=3.41$ ,  $SD=1.49$ ; Secondary,  $M=3.39$ ,  $SD=1.41$ ). A slightly higher interactivity score was recorded among primary school pupils, which suggests a similarity with the lower level of empathy among secondary school pupils, compared with the primary school students.

## 4. DISCUSSIONS

Emotions are an important component of human life, and therefore each person needs to develop competencies that are related to recognizing and managing emotions, effectively resolving emotional conflicts, and establishing close, positive relationships with other people. Although it can be learned and improved throughout a person's life, the early childhood is considered to be the best period for the development of the emotional literacy.

Considering the fact that the field of emotional intelligence and emotional literacy is still a new area, not thoroughly researched and understood, and that there are not many relevant empirical research studies in Serbia, the aim of our research was to initially map emotional literacy of students and discover some of the characteristics of its key components related to sex and age.

Research results that are interpreted according to the Claud Steiner's theoretical model have shown that the students in general have an average level of emotional literacy. The results of the analysis of the subcomponents of emotional literacy by sex suggest that girls generally show a higher level of emotional literacy compared to boys, which is manifested through: a higher level of differentiation of emotions and interactions, as well as through lower scores on the absence of an emotional reaction. The results showing the level of the empathy are generally low and sex differences are not significant in this area.

Furthermore, the analysis of the results by the age of the examinees shows statistically

significant differences in the opposite direction between the two components. That is to say, older students have a higher level of differentiation of emotions and a lower level of empathy than younger students.

The finding that might be especially interesting as a base for the future research is the data of the survey that high school students show a significantly lower degree of empathy compared to elementary school students. This age inversion tendency raises a number of questions: what are the reasons for relatively low level of empathy among students in general? What is the cause of the lower level of empathy among older students? What factors have contributed to it? We think that the answers to these questions should be sought in the next research in conjunction with the contextual factors of social transition, general social crisis, anomia and the value crisis in society, as well as with the specificities of the psychosocial age of older examinees – characterized by the development identity crisis (Erikson, 2008).

Another data that requires further and more detailed analysis is a conclusion of this research that a large number of students, especially boys, exhibit the signs of emotional indifference and suppression of emotions.

The overall results of the research support the need for monitoring the emotional development of young people, new and more comprehensive research, as well as a systematic influence on the development of their emotional competences, which requires a more active role of the school.

## 5. CONCLUSIONS

If the imperative of modern education is a modern, humane and more efficient school, which takes the real life forces of the child as its starting point and is entirely focused on areal, authentic student with his or her actual capacity for development, needs, interests and development problems (Kostović, 2006), this kind of school actively participates in the development of the emotional literacy of its students.

What are the chances that the emotional literacy of students becomes integral part of the educational process? Will emotions finally get legitimacy in educational discourse? Is there room for realistic optimism? Those questions are still open for all professionals in education in our country.

The facts about educational practice



in Serbia show that socio-emotional learning programs have not yet found their place, although education experts agree that educational outcomes should not only be academic, but also social and emotional, and that much of the existing and growing problems are students and teachers are, by their nature, affective.

In countries that have recognized the importance of emotional literacy and already have a wealth of experience in this regard, the main focus is on the development programs of emotional and social competence in children and young people (SEL programs). Such programs are usually aimed at acquiring knowledge, attitudes and skills related to the recognition and management of emotions, social relations and relationships and effective decision-making (Munjas, Samarin and Takšić, 2009; Zins and Elias, 2006). Some of the programs are more general and integrated into educational curricula, while others are specific and targeted at particular problems and challenges that young people face (e.g.: Programs for the promotion of mental health; Programs for the prevention of abuse of psychoactive suspensions; Programs for the prevention of asocial behavior, school absenteeism and substance abuse; Programs for the promotion of academic success and learning; Programs for the positive development of young people. (Marić, Jurišin and Kostović, 2016). Experiences and good practice models in the aforementioned preventive and curative intervention programs could be a support in the creation of such programs in our country.

When creating and introducing these programs, it is necessary to acknowledge the fact that the teacher is a key link in the functioning of the school and that his or her role is crucial in the “bringing to life” of contemporary theories and curricula in direct practice. Research also provides useful guidelines in this field, pointing out that it makes sense to first help the teachers to become “emotionally literate” (Jennings and Greenberg, 2009). Vocational and professional training programs for teachers are primarily based on training the practitioners to recognize emotional factors that influence student behavior and to choose appropriate actions that will contribute to creating a more favorable emotional climate in the classroom, and thus to a better school achievement of students (Perry and Ball, 2007; Keener et al., 2007; as cited in Pantić, 2009).

The resources and time are needed for any change in education. Various experiences of innovation in education confirm that it is

not enough just to introduce a change, but it is necessary to understand and accept the reasons for its introduction. If the teachers do not accept the educational innovation and incorporate it into their personal and professional identity, the chances for its success are, quite certainly, considerably weakened.

We believe that our research of the characteristics and level of emotional literacy of students contributes to understanding the importance of this topic in the discourse of modern school.

Although the role of the school is the most prominent, we believe that the development of emotional literacy should be more widely understood as the responsibility of all institutions and individuals working with children and young people (families, educational authorities, governmental and non-governmental organizations and wider community) in particular those whose professional interest is to provide assistance and support in their growth and development.

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## Conflict of interests

The authors declare no conflict of interest.

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# FEATURES OF CREATIVITY AND INNOVATION DEVELOPMENT IN STUDENTS AT SECONDARY AND HIGH SCHOOL

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## ABSTRACT

The development of potential abilities and capabilities of the person in his/her adolescence is one of the important directions in the activities of contemporary psychologists-practitioners. A characteristic feature of this paper is the integration of psychological and pedagogical approaches to the analysis of the background foundations for the development of innovativeness and creativity in a personality in the educational environment of high school. The aim of the present work is to develop the technology of formation and realization of innovative potential of a personality basing on the empirical data. The study analyzed the qualitative and quantitative characteristics of the peculiarities of the innovation and creativity manifested by 13-14 and 16-18 year old students. The study is based on the following methods: 1) Creativity test composed by N. V. Vishnyakova; 2) "Self-evaluation scale devoted to innovative qualities" by N. M. Lebedev, A. N. Tatarko; 3) the method of "Personal readiness for changes" developed by Canadian scientists Rodnik, Heather, Gold and Hal. The authors used non-parametric U- criterion by Mann-Whitney and Spearman rank correlation coefficient as the main mathematical methods of research. Interpretation of the numerous data suggests that there are significant differences in the characteristics of creativity and innovativeness manifestation among students of different ages. Based on these data, the paper presents recommendations for the improvement of psycho-pedagogical technologies of supporting the formation of innovative potential of personality in high school.

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## 1. INTRODUCTION

New challenges of social development in the twenty-first century require any person to manifest the personal qualities and abilities to adapt to the dynamically changing conditions of life and work. The reality of professional activity makes a modern specialist demonstrate not only intellectual and creative abilities, but also such personal qualities as the speedy introduction of new ideas and projects, leadership, responsibility, ability to work in a

team, initiative, ability to achieve results with limited time and manufacturing resources.

Potential abilities are developed in the process of learning, communicating and acting within secondary and higher educational environment. Therefore, modern technologies of psychological and pedagogical support of the personality development in the framework of the educational process also should be focused on the results of the research devoted to creativity and innovativeness among adolescents and students of high school.

The strategy of Russia's development until 2020, elaborated by the state, obliges the practitioners of the educational system to develop the younger generation's ability for social activity, rapid adaptability under the changes in the surrounding reality, willingness to generate new ideas, their adoption and implementation for the benefit of the society.

To implement this strategy it is necessary to study the peculiarities of high school

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students' personality traits' manifestations, to develop and implement new educational technologies that contribute to the formation of potentially effective personal capital for future generations.

The potential of the individual can be considered as the optimum combination of personal traits and abilities that are manifested in certain types of direct practical activity within the social processes.

On the basis of the systematic approach to the study of individual properties and traits, an innovative potential is considered as the sum of personal resources (assets), embodied in the interconnected kinds of activity (Kirton, 1984; Damanpour, 1987; Goldsmith and Hofacker, 1991; Lebedeva, 2002; Novković Cvetković and Stanojević, 2017). The structure of the innovative potential of the personality consists of the following types of activity:

- value-motivational (constructive effectiveness),
- active (innovativeness) and
- intellectual (creativity).

The innovative potential of a personality is the integrated set of aptitudes, abilities and qualities of a man, realized as the outcome of his inclusion into the innovative activity. They consist of interrelated and mutual components: constructive effectiveness, innovativeness and creativity expressed in intellectual and value-motivational kinds of activity (Mikhailova, Kudinov, and Jerez, 2015; Mikhailova and Kaminskaya, 2016).

The study of creativity from the position of a psycho-economic model by D. Robinson and M. Ranko allows one to present creativity as a result of economic and time resources that the society finds necessary to spend on the development of the creative potential. In this case, the decision depends on the level of development of the society itself, and creativity is considered as the ratio of investments, risk and benefits (Gupta, Wilemon, 1996; Robinson, Marshall, Stamps, 2005; Tsai, 2018).

In their research, the proponents of the systematic approach to the study of creativity, D. Simonton and M. Csikszentmihalyi, focus on the study of various determinants of creative potential, social and cultural human environment, which contribute to the manifestation and development of creativity. M. Csikszentmihalyi emphasizes the study of the relationship between a man, the subject area of his activities and the environment. He believes that the educational environment consists of cultural and social components. In the process of active activities, a developing person inter-

acts with the socio-cultural components of the educational environment, which influence the formation of personality traits and qualities in a constructive way (Csikszentmihalyi, 1999; Simonton, 1997).

E. Torrance believes that creativity is associated with the problem solving process and includes sensitivity to problematic situations; search, selection and formulation of a problem; generating hypotheses, methods of problems' solution; hypothesis testing; finding and formulating solutions; interpretation and popularization of the results (Torrance, 1988).

Despite the fact that theoretical and experimental investigations devoted to the manifestations of creativity in different periods of personal development have already been carried out, the problem of creativity being connected with innovativeness and the peculiarities of the formation of these personal traits has been considered extremely little in Russian science. Still, creativity and innovation are the foundations of its formation and implementation in the context of the studies devoted to the human capital formation and development (Kudinov, Kudinov, Kudinova, and Mikhailova, 2017).

The development of personal traits is greatly influenced by the educational system, professionalism of the teacher, culture of the educational space, whereto the child is immersed during the most important stages of his/her development. The following guidelines in capacity building and gaining the capital for future generations are relevant in the strategy and tactics of modern education: personal development, social activity, humanitarian and technical education, physical and psychological resilience. An important direction in the development of personal potential is the formation of activity, which is based on innovation (Hofstede, 1983; Valacich, Dennis and Connolly, 1994; Paulus and Yang, 2000; Stošić and Stošić, 2013).

In our latest research, innovativeness is considered to be an integrated set of personal qualities, the main of which are: adaptability, independence, persistence, willingness to take risks for the sake of achievement, openness to something new, intuition, constructive leadership, creative direction and positivity (Lebedeva, Bushina, and Cherkasova 2013; Mikhailova and Kaminskaya, 2016). Considering innovativeness as a set of personal traits, we believe that the most favorable periods for these traits' formation is teenage and senior school age.

The peculiarities of formation and de-



velopment of a personality in adolescence and senior school age groups always remain under scrutiny in the psychological science. The dynamically changing environment of socialization forms the new characteristics of personal traits' manifestation in these age periods.

In adolescence period, both physiological and psychological changes take place, which lead to changes in behavior. According to D. B. Elkonin's classification, adolescence covers the period from 10-11 to 14-15 years (Elkonin, 2001). It is often called transitional, critical, emphasizing the difficulties of adolescents' personal development.

The person's development in this age is a transition from childhood to independent and responsible adulthood. This is an intermediate state between childhood and adulthood. Together with the quest for the self-conscience development, the formation of the personality's ideal, there appears a propensity for reflection, development of volitional qualities, necessity of self-assertion, self-perfection, self-determination. The primary new formation of this period, from the standpoint of L. S. Vygotsky, is the social consciousness transported inside, i.e., the formation of identity. Its appearance creates the conditions for further personal development.

The individual's physical maturation gets completed in senior school age. According to D. B. Elkonin's classification this age (from 15 to 18 years) is considered to be early adolescence (Elkonin, 2001). According to E. Erickson's studies, the central process of this age is the formation of personal identity, the discovery of one's own "self" (Erickson, 1968).

The development of the creativity phenomenon in adolescence and senior school age groups is studied in the works by J. Guilford, E. Torrance, D. Simonton, D. B. Bogoyavlenskaya, O.A. Klyueva, P. I. Chernetsova, L. D. Malceva, T. I. Vinogradova, E. I. Nikolaeva, E. M. Belyaeva and other researchers (Guilford, 1959; Torrance, 1988; Simonton, 1997; Bogoyavlenskaya, 2002; Bogoyavlenskaya, 2011; Bogoyavlenskaya and Klyueva, 2012; Malceva, 2013; Chernetsova and Vinogradova, 2015; Nikolaeva and Belyaeva, 2015).

## 2. MATERIALS AND METHODS

The described aspects explain the purpose and hypotheses of the present study. In our opinion, there are peculiarities of connection between the forms of creativity and inno-

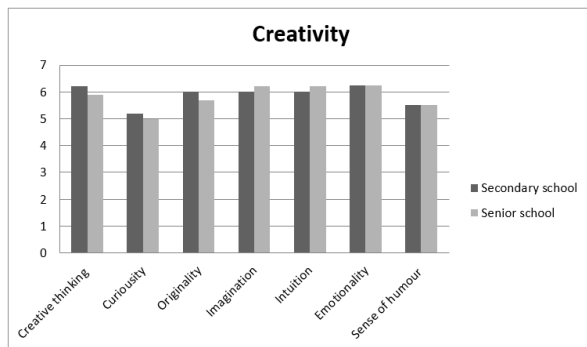
vativeness in adolescents and senior students, also creativity and innovativeness manifestations will have typical age-explained differences.

The study involved 96 secondary school students. Of these, 48 students studied in 7-8 grades (13-14 years) and 48 high school students studied in 10-11 grades (16-18 years). By gender the sample is almost equal. In the group of adolescents, 23 boys and 25 girls participated in the study, and in the group of high school students there were 24 boys and 24 girls. The study was conducted on the basis of school № 14 of Moscow South West Autonomous Area. The research was organized and the data was collected with the active support of a social psychology Master's graduate, L. V. Petrushina.

The following research methods were used: 1) Creativity test by N. V. Vishnyakova (Kaptsov, Kolesnikova, 2011); 2) "Self-evaluation scale for ones' innovative traits" by N. M. Lebedev, A. N. Tatarko (Lebedeva, Bushina, Cherkasova, 2013); 3) The method of "Personal readiness for changes" developed by Canadian scientists Rodnik, Heather, Gold and Hal. The translation and initial testing of this method was conducted by N. Bazhanova and G. L. Bardier (Bazhanova, 2005). As the main mathematical methods of research we used non-parametric Mann-Whitney U-criterion and Spearman's rank correlation coefficient. The statistical data processing was performed using the SPSS 20.0 computer program.

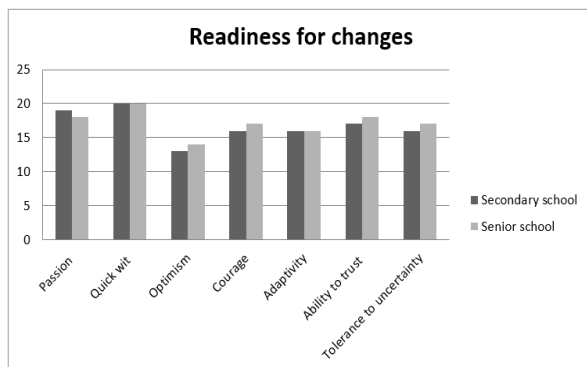
## 3. RESULTS

In the process of qualitative and quantitative analysis of the investigated data the following results were demonstrated by a group of secondary school students. Creativity indicators in adolescents (students of 7-8th grades) are higher than those of high school students (students of 10-11th grades). The results of the qualitative analysis clearly show that secondary school students demonstrate higher results on scales of creative thinking, curiosity, originality (Figure 1).



**Figure 1.** Comparison of the “Creativity” test results in groups of secondary and high school students

According to the results of the method “Self-assessment of one’s innovative traits”, creativity scale results turned out to be higher among students of teenage group (Figure 2).



**Figure 2.** The results of the scale “Self esteem of innovative traits” in groups of secondary and high school students

The data obtained allow us to conclude that adolescence is dominated by intellectual activity, expressed by characteristic features of creativity. The results of rank correlation analysis for all the scales of the used methods also showed that significant links could be discovered in terms of originality - optimism, emotionality – courage. Besides, in addition to the results of the general index of innovativeness in adolescents are associated with indicators of the passion scale in the test “Creativity”. The results of correlative analysis allow to conclude that the group of adolescents is dominated by the emotional component of the intellectual activity of the individual (Table 1).

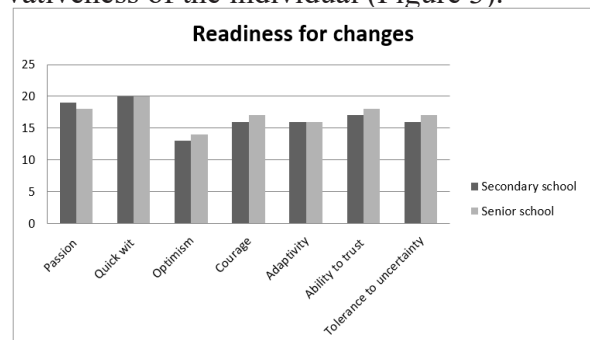
**Table 1.** The results of rank correlation analysis for all techniques in groups of adolescents (n = 48)

No of the pair	Scale name	Value
1	“adaptability” - “courage”	.369
3	“originality”-“optimism”	.384
4	“emotion”-“courage”	.391
5	“orientation towards the future” –“tolerance for ambiguity ”	.390
6	“general index of innovativeness”-“passion”	.402
13	“optimism”- “originality ”	.384
14	“courage”-“emotion”	.391

Note: \*\* - significance level  $p < .01$

In their manifestations of innovativeness, the adolescents demonstrated significant connections on the scales of tolerance for ambiguity and orientation towards the future (Table 1). Thus, secondary school students tend to have a more reserved attitude to the semantic foundations of the future. According to the results of “Personal readiness for change” technique, the adolescents have higher indicators on the scales passion and resourcefulness that testifies to the prevailing emotiveness of the people in this age group (Figure 3).

However, in general, the results of innovativeness indicators in the group of secondary school students were lower than those of high school students. Indicators on the scales risk for success, orientation towards future, the general index of innovativeness appeared to be higher among seniors (Fig.2). The results of the qualitative analysis of “Personal readiness for change” technique, senior students also demonstrated higher indexes on the scales optimism, courage, confidence, tolerance for ambiguity. The findings suggest that senior students develop the activity, which is expressed by the indicators of growing innovativeness of the individual (Figure 3).



**Figure 3.** The results of enquiry on the technique “Personal readiness for changes” among secondary and high school students

The results of correlative analysis allow to conclude that more statistically significant correlations between the scales of creativity and the general index of innovativeness were discovered in the group of high school students. Statistically significant links on the scales of passion, emotion, creativity and innovativeness are expressed (Table 2). Activity intensity among high school students expressed by characteristics of the individual innovativeness is manifested in connections between quick wit, creativity, creative thinking, orientation towards the future and the indexes of the general index of innovativeness (Table 2). The conclusion to be drawn according to the data obtained through the analysis of the rank correlation results is that the indicators of innovativeness are developing with age.

**Table 2.** The results of rank correlation analysis for all techniques in a group of high school students (n = 48)

№ of the pair	Scale name	Value
5	"emotion"- "passion"	.479
6	"creative thinking" - "quick wit"	.397
7	"creative thinking"- "optimism"	.433
8	"creativity"- "passion"	.371
9	"creativity" - "resourcefulness"	.458
10	«creativity» - «ability to trust»	.405
11	"the risk for the sake of success"- "resourcefulness"	.471
12	"orientation for the future" – "resourcefulness"	.462
13	"general index of innovativeness"- "passion"	.426
14	"general index of innovativeness" - "resourcefulness"	.618
15	"general index of innovativeness"- "confidence "	.496
16	"creative thinking and intuition"	.435
17	"creativity" – "creative thinking"	.388
18	"orientation towards future" – "sense of humor "	.410

Note: \*\* - significance level  $p < .01$

High school students are more focused on the future, more resourceful, more optimistic. In this age group the connection between creativity, ability to trust and the general index of innovativeness are expressed, which indicates the growth of activity involvement of the individual in the openness of communication and trust in information, as well as readiness to apply it in creative projects.

Interestingly, when orienting towards

their future high school students demonstrate a sense of humor. Therefore the graduates are positive about the fulfillment of their potential. Despite the growing prevalence of innovativeness indicators in the studied sample of high school students the connection between general creativity and abilities to creative thinking are sufficiently expressed (Table 2).

Despite the fact that the results of the qualitative analysis in the values on all scales in methods used in the study revealed differences in the manifestations of creativity and innovativeness in the studied groups, the results of mathematical analysis with the use of U - criterion of Mann-Whitney showed no such marked difference. The significant differences in the manifestations of innovativeness and creativity at the statistical level were obtained only in the creative thinking and orientation toward the future (Table 3).

**Table 3.** The indicators of significant differences in the U criterion by Mann-Whitney between the two studied groups

Ranks				
The names of scales and methods	N	Average rank	The sum of the ranks	
The creative thinking	1	48	55.96	2686.00
	2	48	41.04	1970.00
	Total	96		
Creativity	1	48	51.24	2459.50
	2	48	45.76	2196.50
	Total	96		
Orientation towards the future	1	48	39.80	1910.50
	2	48	57.20	2745.50
	Total	96		
General index of innovativeness	1	48	44.83	2152.00
	2	48	52.17	2504.00
	Total	96		

## 4. DISCUSSION

The obtained results allow to conclude that, in general, secondary school students have higher rates of intellectual activity expressed by characteristics of creativity, more pronounced tendency to creative thinking along with greater emotionality and originality in their intellectual work. This age group is characterized by lower results in terms of innovativeness.

The sample of high school age has a large focus onto the future and higher indexes on all the parameters of innovation. However, the growing involvement in the activity, expressed by the innovativeness displaces intel-

lectual activity and indicators of creativity in the senior school age become lower. Probably, orientation towards future, positive pragmatic perception of their own activity, emerging practice-oriented intuition and the increasing reproductive thinking are able to displace originality and curiosity typical of intellectual activity and adolescence in general.

In order to maintain creativity and development of innovativeness it is important to develop new psychological technologies of teaching process organization. Modern technologies are based on the expansion of forms and methods of interactive learning, educational design modeling, based on a methodologically sound optimal combination of reproductive and problem - searching methods of teaching in their interaction.

An important direction in the strategies of educational design is the development of intellectual and enthusiastic activity for students to independently find solutions to educational problems, to form abilities for self-transformation and self-development by means of properly organized collective cooperation that would stimulate critical thinking, constructive engagement, new ideas promotion, social creativity in action and group enthusiasm.

The basic technologies of creativity and innovativeness development in secondary school students can be the practice of interactive learning and the strategy of educational process organization with the optimum combination of methods. In this sense, the interactive methods are rightly called the promising technologies of the XXI century that have future in the changing educational environment of the informational society. Interactive learning is a form of cognitive activity organization, which can be defined as dialog learning, in which interaction of educational process participants is taking place. The technologies of interactive learning are based on modeling of practical situations, the organization of role-playing games for collaborative problem solving. A joint project appears in the process of communication, here each member of the group contributes. It is important to exclude the dominant influence of one of the group members or some specific idea.

Interactive learning involves different forms of teaching process organization: 1) formation of a new experience and its theoretical understanding through its application in practice; 2) development of a joint independent activity, when the participants' experience and knowledge serve as a source of mutual learning and mutual communication.

For the effective organization of interactive communication in the learning process it is important to possess the technology of didactic design of the learning process on the basis of optimal combination of methods. In recent years, the scientific literature increasingly often uses the phrase 'pedagogical design' borrowed from foreign sources. This concept is regarded as a (Eng.: Instructional Design, Instructional Systems Design, ISD, French: Ingénierie pédagogique) which is the scientific direction connected with the development of the most effective, efficient and comfortable ways, methods and training systems that can be used in the educational process.

The relevant direction in educational design is the optimal combination of the methods in the structure of interactive forms of learning applied in secondary schools. The developmental aspect of this educational design is forms and methods of development, not only relating to cognitive processes, but also to the students' socially significant personal traits, because the development of social intelligence is an important basis for the person's successful self-realization in the future. In the process of learning, the problem of cognitive and personal traits development is represented in the form of specific objectives: to teach students to analyze, to identify the main thing, to compare, to build an analogy, to generalize and systematize, to prove and disprove, to define and explain concepts, to pose and solve problems, to actively support new ideas of their own and of the others' under the constructive cooperation in a team of peers.

The main didactic goal of the optimal combination of the reproductive and problem - searching methods of teaching in the interaction is the development of intellectual and enthusiastic activity for the students to independently find solutions for educational problems, to form abilities of self-transformation and self-development through inner freedom, critical thinking, the creation of individual ways of action through the practice of suggesting new ideas, social awareness of action, responsibility, efficiency, group activity.

## 5. CONCLUSION

When designing interactive forms of learning based on an optimal combination of the training methods one needs to master the ways of educational process management, to influence the controlled entities by the scientific justification of planning, organization



and control of their activities. The most important indicator of a teacher's organizational effectiveness is his ability to efficiently use the class time. The second indicator is the organization of such an educational process in which students can and, most importantly, want to effectively apply their knowledge in reality. The main way to increase the effectiveness of the educational design is the formation of teachers' abilities to choose the most significant, most important material for some specific class: - to identify the main ideas (in the training material); - to master the ways of didactic communication, based on the principles of relevance, accessibility, clarity on the background of emotional-motivational attractiveness of the material for the students; - to manage the practical organization of the students' independent activity.

When determining the optimal combination of methods for a specific type of class, one should use a systematic design that allows to divide the process into the following phases:

- analysis - determining the purpose, form and content of the classes and, as a consequence, a reasonable choice of training methods' integration;
- design - defining the phases, activities in the class that help to properly use the sequence of methods' application;
- implementation - development of methods and didactic material;
- combination - connection of a lesson fragments into a unified whole;
- adjustment - monitoring the actions in real practice;
- analysis and self-analysis – assessment of the effectiveness of teaching methods' combination in a definite type of class;
- testing - checking the teaching process outcomes and the students' development in this system.

The educational effect of these forms of interactive learning based on the optimal choice of methods leads to the following results:

- High motivational activity of all the participants of educational process due to the presence of a common goal.
- Social interaction. Working in a small group, students will develop social interaction skills; they learn not only to express their ideas but also to listen to others; they develop emotional flexibility and persistence; they form the ability to manage their emotions, when everyone's opinion is perceived and evaluated by the group.

The development of personal traits, self-

esteem boost. Everybody has the opportunity to learn how to play the leading role, and the role of an ordinary group member in a situation of group decision making, how to develop the ability to openly interact with others while preserving your own individuality.

- Building constructive communication skills of all participants of the educational process.

- Effective memorization of the didactic material through repetition and application of knowledge in practice, through the analysis of the problematic situation in the group from different points of view.

Immersing into the conditions of interactive learning, the students are involved in the process of organized self-development and the development of their classmates, helping them to analyze their mistakes and to overcome them.

This creates an opportunity for constructive interaction, in which the capacity for personal self-development is formed through social interaction. It is important to note that the main role in the development and maintenance of innovativeness is played by a pedagogical stimulation of these personal traits among peers. In modern educational conditions, it is very important to include the creation of motives-making conditions of activity, which is aimed at including the person with a leading position into social relations with the group. Special attention is given to psychopedagogical technologies of development of creative identity, based on civic identity, positive values and motivational priorities of personal and professional self-development. In addition, teenagers and high school students need to develop the skills of self-knowledge and self-potential as well as the abilities, skills of managing the enthusiastic activity based on collective interaction, cooperation and constructive communication.

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# TOWARDS DEFINING MEDIA SOCIALIZATION AS A BASIS FOR DIGITAL SOCIETY

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## ABSTRACT

The present article analyzes media socialization as one of the key factors for the formation of a digital society, involving the participation of individuals and communities. The objectives of the article are: to justify the impact of family educational institutions and community environments as contributing to the development of digital skills, attitudes and media literacy. The analysis is based on three rounds of European Social Survey (ESS) - national representative surveys carried out in 2006, 2009, 2012/2013, and 2012/2013 that analyzes the participation of the Bulgarian population in the social and political life of the country. In addition, the results of empirical studies conducted at the South-West University "N. Rilski", Blagoevgrad, Bulgaria for the period 2003-2017 are presented. The main conclusion of the article is that media socialization, based on media ecology information is important, because people acquire a clearer perspective as to how to evaluate a situation and to the increased opportunities for personal realization and development.

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## 1. INTRODUCTION

Individuals as social actors in the age of digitization interact with various social media on a daily basis. This interaction is achieved under the form of bilateral communication: on one hand the media socialize - inform, bring up, educate, advise; while on the other hand, individuals make their mark on social media via messages and images which they create, post and discuss.

Media socialization becomes a significant element of research interest through the development of information technologies - at the end of the second half of the 20<sup>th</sup> century and shows the importance of the media as a factor in education, upbringing and training (Frau-Meigs and Hibbard, 2016).

The main thesis of the present article is that media socialization is an important factor for social inclusion and plays a fundamental role in the resurgence of civil society; because media socialization introduces in various networks and contacts through which the individuals interact, and which have influenced the achievements, results and mobility of the individuals.

At the same time, social capital is one of the objectives of socialization and it is very important because it contributes to independent critical perception and evaluation of the communities and media content; as well as the media themselves. The social capital promotes competent communication between people that make informed choices and puts the accent on the vitality of civil society, as well as on the ways and patterns of its manifestation. All that puts forward the necessity of studying the specific features of the social capital in today's digital society, as well as studying the ways of its improvement and especially the importance of social media as social capital mediators. The analysis of those two key concepts establishes particular aspects of the framework of the community activities dynamics in contemporary Bulgarian society,

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because social capital follows specific parameters and patterns of connection between people.

The key idea of the present article is that social capital is the base of public activity, because it is founded on various contacts and nets in which individuals participate and those contribute to social coherence and human mutual activities. In that sense, social capital is a factor for the creation of collectivity, reflecting on the endorsement of professional and community involvement.

The study of media socialization „is about assessing the impact of media use and exposure on socialization process (Genner and Suss, 2017:1). Media play major role because they are main mechanisms of globalization and have their significant place in the world society, becoming a mediator of various relations and contacts. The diverse background of youngsters is one of the reasons why media and especially digital media become an environment for creating social abilities and skills. In this sense, social capital is the link between media socialization and the formation of culture associated with digital products and services distributed through a global network and building social experience and knowledge in a broader sense. Therefore, it can be said that depending on its structuring, organization and direction, based on its models of communication, social media are prerequisite of individual and group values, perceptions and views, attainments and participation in networks.

## 2. THEORETICAL FRAMEWORK

### 2.1. Media socialization

Socialization is the process by which the human person perceives and internalizes in his/her life course the socio-cultural elements of the environment, integrating them into the structure of his personality under the influence of experience and significant others, adapting to the social relations in which the individual participates. Socialization should be seen as a process that extends over a person's entire life. The socialization process enables a person to form a sense of self and of his status in public structures. According to Parsons, socialization is the process of assimilation and internalization of roles from the social environment (Parsons and Bales, 1956). During socialization, the actor step by step absorbs both the explicit and behavioral standards of the social system as values, norms, attitudes, until they become internalized goals and self-effective motiva-

tors for action and personal thought.

Socialization can be defined as a type of social learning that occurs when a person interacts with other individuals. The acquisition of social experience creates preconditions for the inclusion of individuals in public relations and socialization is a process of comprehensive and consistent introduction of the individual in the objective world of a society or part of it (Berger and Luckman, 1991).

Agents of socialization are family, education, friend communities, professional environment, media.

Media socialization is related to the impact of media content on the individual, "duration of media usage and exposure, preferences for specific media genres and programming" (Genner and Suss, 2017: 1). It activates: the cognitive motivation and acquiring of new knowledge and skills; affective motivation oriented to achievement mood management; habitual motivation aimed at structuring the day; social motivation related to interactions (Genner and Suss, 2017).

The media contribute to internalization of the values, beliefs, and norms of group environment as well as they create values and subcultures providing new role models and motivating young people to follow and acquire it. In this way the media have a great impact, because they serve as a platform for ideas and people which youth deems important.

Media among other agents such as family, school, peers engaged in "primary socialization" covering the period of childhood and adolescence; but the media are involved in the formation of social consciousness and habits throughout the whole life of the individual. The socialization of personalities by the media is a process which achieves the formation of values, norms, attitudes of the individual and his interests, goals and awareness, and it can be said that the media participate in the shaping of the civil society and social involvements of different groups and communities. (Peicheva and Milenkova, 2017).

Media socialization involves all media that have various degrees of influence on groups and individuals. The media indeed are specific systems for the collection, creation, transmission and perception of information, images and symbols created by people and aimed at people. Through media contents, a person becomes more aware to the surrounding world, gains a better insight into the essence of things and phenomena, develops his/her value system and establishes its social position in structures and relations. Today's

world is very complex and it varied with the media acting as an intermediary that helps to explore the reality.

In this sense, the media and especially the new media (social networks, blogs, chats etc.) becomes one of the main regulators of public relations. That's why the media can manipulate social communities, influence personal behavior and attitudes and it has a great contribution to the socializing process.

Social media open individuals to various cultures and understanding through different kind of interactions. Thus the media help people to learn, see and feel many things that happened in different places, give information about recent events almost instantaneously. Social networking sites allow the individual to communicate with people, helping the person be active. So we talk about mediatization of society, which means the interrelation between change in media and communication, on the one hand, and change in culture and society on the other (Livingstone, 2009; Polski, 2013; Grusec and Hastings, 2014; Poell, 2014; Grosswiler, 2016).

People are constantly surrounded by the media, which have the power to dictate how to learn about what is going on in the world, as well as how to appropriately interact with one another. The new environment requires the development of digital skills that enable effective information management and the proper use of ICT (Peicheva, Milenkova, et al 2017; Cartelli, 2013). Digitization, interactivity and virtuality are constantly opening up new possibilities and extending the boundaries of learning (Rosengren, 2014; Henriksen, 2011). "Mobile devices are emerging as one of the most promising technologies to support learning as they offer new opportunities that do not offer static devices" (Stosic and Bogdanovic, 2013).

Media connect people to various social institutions. Young people want to be seen as progressive in their environment and the media create the ideal image that says what characteristics must be formed in order to be suitable for the relevant social groups. They show who should be imitated, how this goal can be achieved, where to buy different things to achieve the likeness. Overall, the impact of the media varies and it is determined by many factors such as the content of messages, as well as the habits of the public, its erudition, readiness, maturity and emotional state. In this sense, the media are differentiated according to the audience. The impact broadly encompasses the processes of behavior and experience

of individuals within the reach of the media. The influence of the media creates phenomena that deserve serious analysis. There are various studies showing the impact of media usage on individuals, like violence and aggressive behavior in society (Lemish, 2015). The role of the environment is also determined as a decisive factor (Anderson, 2008). In this context essential element of media socialization are the significant others, the extent to which media messages break through the prism of group norms and rules in the relationship between the personality and society. (Peicheva, et al 2018).

The family is of great importance to media socialization, because parents are the ones from whom the children learn various aspects of the world, including the media; kids are informed for different sources of information thanks to their parents, and they receive access to various digital devices: computers, tablets, Internet, mobile phones. Namely parents are the people who may impose certain restrictions on the viewing of TV programs or usage of the Internet; and not only on what to watch, but as to how long. Thus, the children can be protected from a variety of negative effects associated with aggression, high anxiety, uncertainty and emotional discomfort related with them (Drotner et al, 2008). Parents are the ones with whom children can discuss a character, an event, a show or a movie viewed in the media as well as issues requiring further clarification, information or support from the parents.

During childhood, parents are the most important intermediaries in media socialization. Parents are the individuals who can provide the necessary cognitive and emotional balance to their children and in the later ages.

## 2.2. Media Literacy

Media literacy outlines a set of skills that are important in the new communication environment, abilities related to the search for information, participation in different networks, as well as the ability to create new knowledge; last but not least, are the ethical challenges relating to correct authorship, compliance, and the limits in which it can manifest itself. The new media literacy facilitates the implementation of innovative approaches to decision making processes.

Media literacy is the ability to analyze and evaluate images, sound and messages that people receive on a daily basis through the

media. Media literacy is not only “the competence to understand the media, to analyze and assess their content, as well as to work with them and to create an adequate media message” Livingstone (2004) but to use them as means for innovations (Peicheva, et al 2018). The four components of Livingstone model (2004) - access, analysis, evaluation and content creation together constitute a skills-based approach to media literacy. Each component supports the others as part of a non-linear, dynamic learning process that opens up the possibility for new uses for the Internet and to an expanded access.

Livingstone (Livingstone, 2004) focused on:

- Historical and cultural aspects of the relationship between: knowledge - media - training - education.

- The fact that the use of the media is a symbolic and material expression of the knowledge, culture and values of the person; their ability to analyze and handling of reality.

- The topic of media literacy, which is placed in the context of individual development.

Livingstone relates media literacy to all types of media - print, electronic and web-based. In this sense, media socialization assumes competencies and knowledge of all media and when we talk about Internet literacy, computer literacy, information literacy, we imply access and abilities for the analysis of the contents, evaluation and creation of new content in different types of media. It could be said that education and media literacy are in interaction and they are complementary, because the usage of digital media by the children from an early age contributes to their mental development due to the intensity of perceptions and it builds up their sensitivity to different topics that have both instructive and educational effect.

Another important element of the psychosocial development of children and adolescents is their imagination, which is important for learning and school activities. Media stimulate the development of the imagination as well as “the use of computers have effects on the creativity of children” (Stosic and Stosic, 2014).

In addition media have an important contribution to personal development associated with the creation of social networking, establishing friendships, and stimulating maturity and opening to the world.

Very often media and mainly Internet are the basic source of information for pre-

paring the classes and for the carrying out research tasks that are undertaken during different subjects at school or university; so the study processes which take place in the institutions of both formal and non-formal education are closely linked with the media. The process itself of cooperation between media and education and the strengthening role of media literacy as complementary educational processes is a subject of daily and systematic implementation and development in any particular educational situation.

Media literacy includes competencies that people should have for their social coping with digital technologies - not so much the technical aspects, but rather with their social aspects applied in new digital environment. Media literacy remains the framework within which the training activities across all levels are undertaken. Actually, we need to create a society where the participation across the digital environment is accessible to everyone, and to ensure the relevance of educational policies in modern conditions (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions).

### 3. MATERIALS AND METHODS

This article is based in empirical plan on several sociological surveys, used quantitative and qualitative methods, and covers the period 2003 - 2015 year.

- There is carried out the survey “Foreign students at SWU: training and motivation,” in 2003 with team leader Dr. Maria Serafimova. The survey was included all foreign students at the university and has been studied 390 individuals. There was made a control group of 390 Bulgarian students (for comparison with foreign class-mates), the sample is representative for Bulgarians in the university. The method used was a questionnaire. Topics under the questionnaire include various aspects of the learning process, students’ preparation for classes, communication students - lecturers, the digital environment and facilities for learning, motivation and values that students share. The quantitative method allows including students of different sex, nationality, with different interests, expectations, attitudes to training and education as a whole.

- The survey “Integration of social-psychological sciences in a globalized world” conducted in 2013 in South-West University



(SWU) with team leader prof. Valentina Milenkova. There are used two methods: structured interviews and focus groups. The sample was unrepresentative included 290 students from various faculties of the university; the sample was made under experimental design scheme. The questionnaire included questions about the teaching methods, learning process, assessment methods and evaluation, digitization of education and digital culture of students. The other method used was a focus group. There were three focus groups carried out with students from Sociology, Psychology and Political Science specialties of SWU. In the focus groups, the discussion revealed on media literacy, forms of communication with teachers, based on digital processes.

- A survey "European Approach for public competency and participation in digital environment" was carried out in 2015 in SWU with team leader prof. Dobrinka Peicheva. The key topic was media education in Bulgarian context and its dimensions. This survey was a continuation of the International project "Media Education Policies in Europe" under the leadership of prof. Divina Frau Meyers, started in 2013; the purpose of the last one was to make Comparative Analysis of Media and Information Education Policies in Europe. The Bulgarian team included prof. D. Peicheva – coordinator, prof. V. Milenkova, Ph.D. student V. Nikolova.

The latest surveys of authors of this article we are referring to are in the frame of the projects D COST 01/13 in 2017-2018 co-funded by Bulgarian Scientific Research Fund and DN 05/11 14.12.2016 with team leader prof Dobrinka Peicheva

Each national study aimed at identifying why media literacy seems currently stalled or having difficulties in reaching national scale and scope. ANR TRANSLIT research suggested that computer literacy, needs to be evaluated as well, separately or in conjunction with the others.

- A survey „Cultural universals in academic environment" was carried out in 2015 at SWU with students from Social study specialties: Sociology, Political Sciences, Psychology; team leader prof. Valentina Milenkova. Topic discussed in the focus groups are connected with the values that students share, communication, media literacy, digitization, significance of media environment as element of university system.

- European Social Survey in three rounds - 2006, 2009, and 2012/3 with Bulgarian respondents living in urban and rural re-

gions aged 18-65 years. Data refer to different aspects of people's lives and their families: living conditions, economic and cultural capital, social support, cohesion and solidarity, family well-being.

The last two 2017-2018 studies on media ecology and e-reading highlight not only the significance of the new media literacy but also the consequences of its irrelevance in the contemporary digital environment.

## 4. RESULTS

The presented results are aimed at showing the importance of the media as a factor for the development of the social capital and the connectivity of individuals as well as their community activities in the new digital environment.

### 4.1. Media socialization and democracy

The media viability would depend on degrees of adoption and of inclination to participation in social processes through different types of activities: "viewing (listening to) political television (radio) broadcasts", "reading of newspapers". As whole, Bulgarian respondents (ESS – 2009 and 2013) are moderately active: in a working day, almost half of the sample (47.1%) in 2009 is viewing news and television broadcasts on political and current events "between half an hour and an hour and a half". Based on the data obtained, it can be said that in 2013 increased slightly the percentage of people who watch political programs (50.8%) than in 2009. Overall activities: "newspaper reading" and "listening to radio" show small accumulations (Table 1, percent).

**Table 1.** Time for newspapers, radio and TV news (broadcasts) in a working day

2009	Viewing TV po- litical broad- casts (2009)	Viewing TV political broadcasts (2013)	Listening to radio political broadcast <sup>1</sup> (2009)	News- papers reading <sup>2</sup> (2009)
No time at all	10.9	6.5	11.6	12.4
Less than 1/2 hour	25.5	18.5	16.1	28.8
Be- tween 1/2 and 1 hour	34.4	34.8	8.8	10.7
More than 1 to 1.5 hour	12.7	16.0	3.7	2.2
More than 1.5 to 2 hours	6.6	8.4	1.8	0.7
More than 2 to 2.5 hour	2.4	3.8	0.6	0.1
2.5 to 3 hours	1.1	2.2	0.	0.1
More than 3 hours	2.2	6.1	1.5	0.1
Don't know	4.3	3.1	55.4	45.0

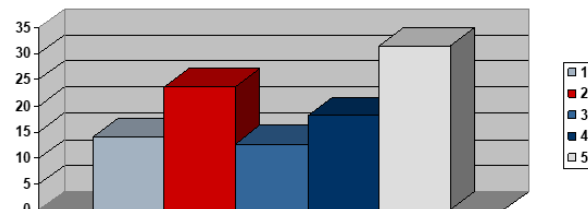
Source: <http://www.europeansocialsurvey.org/data/country.html?c=bulgaria>

<sup>1</sup> This question was not included in the round 6th of ESS - 2013

<sup>2</sup> This question was not included in the round 6th of ESS - 2013

In addition, we should point out the proportion of people (22.8% for 2009) who watched political broadcasts for ongoing events during workdays between 1.5 hours and 3 hours. This definitely is a low percentage of Bulgarians who are interested in political life. It bears repeating that, these are activities which are performed on a daily basis, it is worth to point out that there is a notable growing trend in accumulated viewings in 2013 (30.4%), compared to 2009. These results are indicative of the importance of the media in the political culture and awareness of Bulgarians for the formation of their citizenship; yet most important is that the media are valued as a reliable source for the creation of sociality in Bulgarian society. Media socialization contributes to democratization, it gives ordinary people power to participate in culture, politics, civil society; this view is contrary to the per-

ception of culture as elitist dividing and opposing. In this context we can view, the results of the non-representative survey “Integrating social sciences in globalizing world” conducted in 2013 by a team from South University where the questions of confidence in the institutions were raised.



**Graph 1.** The level of trust in social institutions: 1 - Parliament (14%); 2 - media (23.2%); 3 - government 12.7%; 4 - president (18.1%); 5 - I do not trust (31.6%); 2013 SWU project

It may be worth noting that the media have the highest level of confidence out of all institutions, and this is because people can choose the type of media, the nature of broadcasts and contents they receive. On the other hand, the essence of social media implies the development of active readers, creating media content, and the expression of opinions on various issues, which definitely makes the media an important source of socialization. In this sense, media literacy can be seen as an important part of the media socialization.

## 4.2. Media Socialization and Family

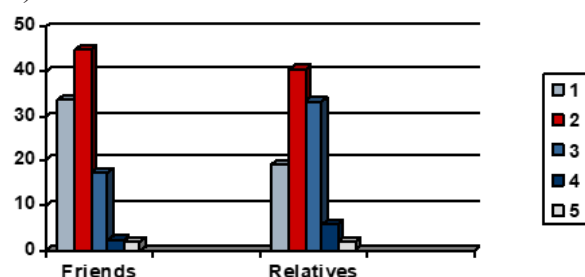
According to the European Social Survey (ESS) in 2013 Bulgarian young people continue to value family. From the data taken from 2013 ESS, 71 % of young people see their future as a part of a family according to their living plans. Almost 2/3 of the respondents indicate that they feel comfortable at home. That was displayed variables:

- Time spent with family;
- Sense of concern for the closest people;
- Forms of mutual assistance.

In addition, in contemporary Bulgarian family, the basic common activity is watching the TV (ESS, 2013). Television is an intermediary that strengthens family ties. This conclusion is confirmed by other studies (Genner and Suss, 2017).

In this regard, during the survey conducted in 2013 we set the following questions: “How often do you discuss with family and friends, information received from the me-

dia?” It can be witnessed that, time spend by young people with friends or relatives to discuss media contents is highly valued (Graph 2).



1 – Every day; 2 – Several times a week; 3 – Several times a month; 4 – Once a month; 5 – Less.

**Graph 2.** How often do you meet to discuss media contents with friends and relatives? 2013 SWU project

The results indicated that media contents (including social media) become the unifying center of relatives and friends because they are a source of topics as socially and personally. Media socialization is viewed through the eyes and opinions of the significant others who are a reference partner for reflection, assessment and exchange of information.

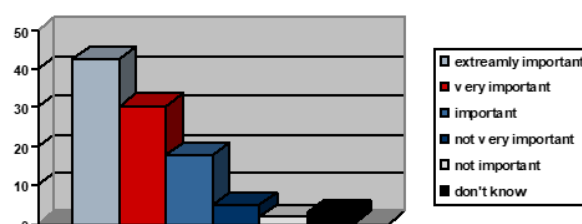
Family is important, because it is a source of support and positive energy. It creates a feeling of belonging and entity.

It is impressive that the respondents are conscious of the necessity of contacts, for discussing media information with friends and relatives. They stick to that regime of proximity and communication, they support social relations' rhythm and they consider that it as important. As a whole, contacts within parental and friendly communities contribute to freely developing discourse, bringing strength to democracy. Interpersonal confidence is very tangible, creating a fundament to human coherence, for which media socialization has also contributed.

### 4.3. Media socialization in the context of education

Media socialization is a purposeful process which in its purest form takes place in an education institutional environment in which the implementation of informational technologies is a key element.

According to a survey conducted in 2013, the students say that digital media definitely contribute to their educational achievements (Graph 3).



**Graph 3.** Importance of digital media for the university education, 2013 SWU project.

On the other hand, there is the reverse process - the higher the education of the individual is, the more often he resorts to the usage of the media as a source of information and development. Modernization in education is aimed at „achieving (1) functional and (2) multi-dimensional literacy of learners, defined as: (1) ability to use knowledge and skills from key cognitive domains to solve problematic situations and (2) an ability that is the basis for participation in the digital society and making informed choices on issues in a high-tech environment“ (Dermendjieva and Dyankova, 2018).

So media socialization is related to education, it acts as an incentive to develop other qualities that are valued in the educational environment and systematic digital media socialization depends on education and its condition (Velickovic and Stosic, 2016).

Education has a key role for increasing personal chances; it is a necessary and important condition for taking a professional position and media competency, as education is a form of investment in better qualification and level of knowledge.

Education is important in personal and social plan, because, people with higher education are:

- More critical
- More open to changes
- More disposed to improvement
- Better professionals
- They have ambitious to enhance their qualification
- They have more knowledge for the world and social situation
- They find jobs easier and their incomes are higher than those of the other.
- They have higher political involvement and responsibility.

Higher education implies higher involvement toward media content, in terms of its assimilation, analysis, evaluation and creation of new content. In this sense, higher education creates critical media users who do

not succumb to the manipulation of media and its impact. In addition, we examine survey results, conducted at the South-West University (SWU), Bulgaria, showing students' access to the Internet, as well as the specifics of ICT at university. The students are the most appropriate age group being mobile and able to respond to environmental changes, a part of which are computers. These changes are needed because computer literacy has become an important part of qualification requirements and are connected with successful professional realization. It is necessary to note that the South-West University curricula offers education for the most informational specialties and computer technologies. At the same time the access to Internet is a basic condition required to improve the quality of education and to sustain active communication – between students and professors (through e-mails, chats, blogs, face book etc.). One of the main reasons for fast growth of the importance of computers in educational communication is the fact that this is the cheapest and the most effective way to contact with students, colleagues, friends, and peers.

In the carried out in 2003 sociological survey approximately 2/3 of all foreign students educated at SWU had access to computers (64.9%) and to Internet (65.6%). The situation with Bulgarian students is identical: 66.1% of all respondents had access to computers and 58.1% had access to Internet. The accumulation of respondents in two groups is indicative for the presence of available conditions for education as well as for the fact that the whole educational process can develop in accordance with the contemporary tendencies in modern higher education.

Twelve years later in 2015, the data about the access to Internet is quite different due to the increase of computers as a part of the university policy to acquire and enhance computers' meaning in university space and guarantee full access to them. The university library, with the readings' halls, computers halls, and laboratories become a part of the university interior. That means that there is a constant access to computers and Internet for students. In addition, above 89% of all students have personal laptops. The access to computers and Internet for several years has become a compulsory prerequisite for quality study process and in this direction the SWU guarantees to students appropriate environment and conditions. The computers and access to Internet have real significance only if they support the study process as an improve-

ment in conditions. The basic concept in this aspect is: giving and discussing homework and essays, requiring additional students' deliverances, and supporting lecturer-student networks. An important part of the whole process of new forms of modern communication is for students familiarize themselves with Internet publications and materials.

So, the interest of young people towards education is increasing because the sources of information are enhanced, and the real education process is being modernized.

According to students, the participation in group discussions, the using of computers and Internet influences on the specific aspects required of people to participate in the knowledge and information based society that demands creating skills for lifelong learning and constantly improving individual qualification, knowledge and competencies.

In the survey were carried out three focus groups with students from social studies specialties. During the conducted focus groups various aspects of digital literacy were discussed including:

- Computer literacy related to: the use of computer programs for word processing, for generating spreadsheets, presentations, photos, images, graphics; use of databases;
- Internet literacy related to: internet access, which search engines are used, what information is extracted, using your email, social networks, blogs and websites related to the preparation during individual disciplines;
- Information literacy associated with: knowledge and use of separate library information resources on the Web;
- Independent thinking regarding: how to analyze, interpret and critically evaluate information; extraction of new knowledge; understanding of the ethical aspects of networking and the Internet.

## 5. DISCUSSIONS

It can be highlighted that, in terms of computer literacy, university students are highly knowledgeable. In all subjects studied, the preparation of presentations using the resources of the various computer programs for the generation of tables, pictures and images is widely included; the students know and use computer tools for word processing and are able to create and format documents.

- Internet literacy is also high. Students daily access the Internet; use e-mail, participate in social networks, mainly Facebook,



have profiles; read websites and blogs, in many cases, however, these activities are not related to training and academic preparation but are connected to personal pursuits and personal contacts, communicating with friends, entertainment, download movies and more.

- Information literacy of students is underdeveloped; mainly this refers to the knowing of the capabilities for the use of electronic publications - books, encyclopedias, journals; but they are not always used. Students do not know the library information resources in the network, and do not know the electronic library of the University.

- Independent and critical thinking - this is the least developed part of literacy of students. A very minor part of respondents critically analyze what they read; they are nearly lacking in the ability to compare different sources; they find it difficult to summarize and digest what they have read; they do not think about the ethical aspect of things and copyright infringement on the Internet.

From all this we can conclude that computer and Internet literacy of students from SWU is very high, but at the same time, it does not find a serious enough space in the formation of independent thinking and both critical and analytical skills. Often students take for granted the information Internet sources without making additional inquiries; also, it can be noted as part of their behavior on the Internet, is that the way they conduct themselves stands out as one devoid of an ethical approach, which is rather disappointing, given the academic values of university. Moreover, it is not enough to have a high-level ICT environment, access to the Internet, it is important to reflect on how digital media literacy can be actively used in school work and how students can become more team oriented.

## 6. CONCLUSIONS

The following basic issues, connected with the significance of education can be brought out, that media socialization is an important and crucial issue as far as individuals of all ages are associated with digitization. From early childhood and schoolchildren, use various media - computer, tablet, smartphone, internet, that become a basic part of the environment: family and school. Media socialization relates to the family, to the way children perceive the digital environment through their parents, to the way children understand the meaning of different media contents. Educa-

tion and teachers have the same role. Digital tools are becoming essential basis for education - school and university. Media literacy is a prerequisite for the full use of the digital resources of the educational process.

It is very important that school and family complement their educative intentions and actions, knowledge appropriated by social media, and attitudes towards them are of great importance to education and its impact. Media socialization becomes equally important in academic terms because information technologies are at the foundation of effective learning, independent thinking and all major key competencies of the 21<sup>st</sup> century (Digital Agenda for Europe).

Technology and media socialization are important for lifelong learning, because through them it becomes possible to integrate long-distance learning, which allows access to learning content at any time and from different points in the social space (West and Turner, 2014). LLL is in close contact with media socialization because individuals constantly improve their skills, knowledge, learn independently or in an organized environment new things, namely media appear that an important prerequisite for improving their lives. Media socialization is also an integral part of leisure time; it is related to entertainment, to the contacts of people of different ages, to the establishment of new acquaintances. Media socialization is also related to the profession of individuals. Based on media ecology information it is a prerequisite for getting adequate information and for relevant professional developments. Media socialization is important because it is used to develop skills for the searching of media ecology information for independent interpretation of information, participation in networks, critical attitude towards the world and life, to the solving of practical problems. Media socialization is important, because people acquire a clearer perspective as to how to evaluate a situation and to the increased opportunities for realization and development. In this way, we can summarize that media socialization related to media ecology information is of great importance to modern people.

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### Conflict of interests

The authors declare no conflict of interest.

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# THE TEACHER'S ROLE AND PROFESSIONAL DEVELOPMENT

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## ABSTRACT

The text addresses the theme of teachers' professional development. The role of a teacher is defined by cultural and social events and the environment, and they influence the differences that occur in the concept of teacher roles within different cultures, societies, including the geographic environment. Thus, in the first part of the paper, based on an analysis of the literature, we identify factors that significantly influence teachers' perception of their role and consequently, determine their professional identity. In the second part, based on the results of the empirical research, we show that factors such as teachers' beliefs about their own qualifications, as well as years of work experience and subject area, statistically significantly influenced the development of the teachers' professional identity. The main findings of the study are that teachers with several years of service experience feel better qualified to perform their duties (tasks related to planning and teaching were rated the most highly) than teachers with less work experience, and that teachers with more work experience evaluated the claims related to their educational activity statistically significantly higher. An important finding is that teachers define their professional identity and consequently, their role through their personality traits, which shows that we must not ignore teachers' personality traits, as they play an important role in teachers' professional development and identity.

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## 1. INTRODUCTION

Regardless of which attitudes we strive for in teaching, the teacher always plays an important role. According to Adams (1970), the role of a teacher relates to what individuals actually do (their behavior), while the role of an individual can also be influenced by the expected actions of individuals (p. 121), in particular the individuals' own expectations (i.e., the teachers themselves) or the expectations of others (pupils, students, parents, colleagues, school leaders, society, etc.).

The role of the teacher is never uniquely defined, and its definition is influenced by many factors. It is defined by cultural and

social events and the environment, and both influence the differences that occur in the conceptions of the roles of teachers within different cultures and societies, including the geographic environment.

The factors that influence the role of the teacher are internal and external. Internal factors include those that influence a teacher's own perception of his or her role. External factors include the views and expectations of the role of the teacher, which arise within other stakeholders, such as pupils, parents, colleagues, school leaders, and the public. Both types of factors are also an important part of a teacher's professional identity. Internal factors that influence the understanding of the teacher's role are created by the teachers themselves and can be classified into two categories: the teacher's own beliefs about which role is important and the teacher's expectations for his or her role.

Teachers' beliefs are beliefs teachers from different sources develop about their role. The beliefs are often secular and not tied to expert knowledge, but they are also considered durable and resistant to changes (McRob-

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bie and Tobbin, 1995; Tobin and La-Master, 1995). Nespor suggested that beliefs have stronger affective and evaluative components than knowledge and that affect typically operates independently of the cognition associated with knowledge (Nespor in Pajares, 1992, p. 309). Above all, due to the emotional charge of beliefs, they often play a central role in organizing knowledge and defining the role of teachers (Beijaard, 1995, p. 245). According to Calderhead and Robson (1991), beliefs that determine the interpretation of individual subjects and concrete behaviors in a class acquired during teacher education play an important role in determining how they will be translated into the knowledge of the beginner teacher, and they determine the way a teacher works in the classroom. Although an individual's knowledge is based on objective facts, beliefs are based on evaluation and judgments (Pajares, 1992, p. 313), and because of the greater emotional charge, beliefs can have a greater influence on how teachers understand their role. A particularly strong role is played by the beliefs of beginner teachers who are more likely (than teachers with more experience) to find themselves in situations that are new and base their reactions on their own experience.

Teachers' expectations determine the understanding of their own role, as the sense of efficiency in the work that teachers experience can also depend on how they see themselves as professionals (Ben-Peretz, Mendel-sona, and Kronb, 2003, p. 278). Teachers' expectations are influenced by the experience and knowledge they acquire during their education for the teaching profession, as during this period teachers begin to build their professional image of themselves as a teacher. Therefore, many authors (Kagan, 1992; Samuel and Stephens, 2000; Rodrigues et al., 2018). emphasize the importance of quality education in the shaping expectations and the idea of their role. In addition to the education experience, teachers' expectations are influenced by the context of teaching. In a 2003 study, Ben-Peretz and colleagues found that teachers who teach pupils with lower abilities see their role differently from teachers who instruct pupils with higher abilities. Teachers' expectations for their role in the class are also directly related to their professional identity. Authors who studied these areas agreed that one of the important elements on which teachers build their professional identity, is also role, that he attaches to himself or attributed to him by surroundings (Goodson and Cole, 1994; Nias,

1989; Volkmann and Anderson, 1998).

### 1.1. Teacher professional development

Valenčič Zuljan (2001) defined the professional development of teachers as:

*"...the process of meaningful and life-long learning, in which teachers develop their conceptions and change their teaching practice; it is a process that involves the teacher's personal, professional and social dimension and represents the teacher's progress towards critical independent, responsible decision-making and behavior."* (p. 131)

Within the framework of professional development, teachers change, improve in the professional field, as well as change, improve, and complement their pedagogical competences and behavior, and change as a person. According to Kalin (2006), a teacher is:

*"...committed to continuous professional development and working with others (colleagues), is aware of the connection between one's own development and the development of students and sees its role also outside the class: it builds the connection with people in the local community and society as a whole, with management bodies and researchers."* (p. 174)

Beijaard (1995) stated that a teacher's professional identity is composed of three factors: the subject they teach, their relationship with pupils, and their role or role conception (p. 282). The latter is built in relation to the object and the relation with pupils and therefore cannot be considered independently of the other two factors. According to Biddle (in Beijaard 2005, p. 293), most interpretations of teachers' roles refer to teachers' tasks, their social position, status, or the status, image, and expectations of other people (especially pupils and parents). Similarly, (Day, 2006, p. 610) stated that the identity of an individual traditionally consists of roles that are defined through the structure of an individual, institution, and society. Teachers' expectations for their role are often associated with the environment's expectations for their role, and finding a distinction between what actually influenced a particular role—the teacher's expectations or the expectations of the surroundings (or the important others)—is difficult. For teachers' expectations for their own role, scholars also consider that expectations can change during teachers' professional careers (which is much easier than changing their own beliefs;

Beijaard 2005, p. 284), which is largely influenced by the experience they gain. According to Beijaard et al. (2004), this is a completely normal process of developing a professional career path, because teachers' professional development, the important part of which is the teacher's role, continues throughout their career and is not something "which the teacher would have permanently possessed in the unchanged form" (p. 107). Many factors influence the process of change. It can happen spontaneously or with various incentives. In this process, changes do not occur at one time but gradually. Yung, 2001, p. 259 stated that this change occurs in three steps: (1) awareness, (2) comparison with alternatives, and (3) identification of actions that are consistent with the alternatives. Most importantly, the teachers themselves must undertake such a learning process. The key to the whole process is that teachers commit themselves, which means that they allow a changed view of their role, and above all, in particular, they allow themselves to be changed. In the context of professional teacher development, Beijaard and colleagues (2000) identified three roles for the teacher: the teacher as a subject matter expert, the teacher as a pedagogical expert, and the teacher as a didactical expert, which together influence the development of the teacher's role and determine behavior in the classroom. Thus, Beijaard sees teachers as good subject experts with a very strong knowledge base in their subject area (Poom-Valickis, Oder, and Lepik, 2012, p. 235), which is not sufficient, as teachers also need to have didactic knowledge to bring the knowledge of the profession closer to pupils. According to other authors, at the same time, teachers must create also a learning environment that supports students with the optimal use of teaching methods and learning strategies (Radovan, 2011). But nevertheless, teacher is primarily understood as the one who is responsible for designing and managing the learner's learning process (Poom-Valickis, Oder, and Lepik, 2012, p. 235). Whereas "teaching cannot be reduced to mere technical or instrumental measures that are reflected in the learning achievements of pupils, the didactic aspect of teaching must necessarily be linked to the pedagogic, which also includes ethical and moral characteristics" (Beijaard, Verloop, and Vermunt, 2000, p. 751), they also see the teacher as a pedagogical expert, who emphasizes relations, values, moral and emotional factors. The pedagogical aspect is also important for teachers' personal and professional understanding of

their role (Beijaard, 1995):

In our postmodern societies, teachers increasingly face moral, social, and emotional dilemmas, such as how to educate students from different cultures and different social backgrounds, how to proceed with deviant behavior of pupils... Apart from these dilemmas, teachers should be aware of many norms and values involved in their interaction and relationship with students. (Beijaard et al., 2000, p. 752)

The connection between professional and pedagogical-psychological skills in the role of the teacher was also highlighted by Kalin and Šteh. Preservice teachers not "only need the knowledge of [their] subject, but also a good knowledge of pedagogical psychological knowledge, competence in curriculum design, knowledge and control of didactic procedures in the subject area, knowledge of pupils" (Šteh and Kalin, 2006, p. 80). Teacher professional development actually begins with training at the faculty when future teachers begin to create their professional identity, which happens through defining and recognizing the various roles the future teachers will take on as a teacher in the classroom (The process of building a professional identity can be also done through mentoring. Positive effects of mentoring have been proven in the study Gjedia and Gardinier (2018)). Muršak, Javrh, and Kalin (2011) noted that "an important part of a professional identity is the image of an ideal teacher. This ideal is the abstraction of concrete persons and their properties" (p. 72). Therefore, beginner teachers start to build their image based on the knowledge they acquire at the faculty (knowledge of the profession and pedagogical-psychological knowledge), as well as based on their own experience gained through their schooling with different teachers. The emergence of experience is pronounced when teachers find themselves in a new and unknown situation, and they have not gained any knowledge to react in such situations. Thus, the mentioned authors believe that teacher education, care must be taken to acquire knowledge in the field of the profession and soft skills, which we call pedagogical-psychological qualifications:

The issue of teacher education and training relates primarily to the relationship between professional and pedagogical competence... The deletion of the boundary between the two can be dangerous, especially if we proceed from the assumption that the teacher's preparation is merely a matter of the mathematical profession and professional knowl-



edge, but not the appropriate pedagogical knowledge. (Muršak et al., 2011, pp. 27–28)

The teacher in the classroom is the whole person, an expert in the profession, as well as an expert in the field of pedagogical and psychological knowledge. Only when we take into account both segments can we talk about teachers. In order to be able to manage the profession, it is not enough, authors also write when they write that “teachers who are otherwise exceptional experts in their profession are not and cannot be able to plan and prepare didactically-methodical adjustments of the subject contents themselves, this is appropriately trained” (Muršak et al., 2011, p. 28).

When talking about a teacher in his professional development, we cannot pass certain definitions that explain some necessary characteristics of a proper teacher, highly important for their development and their pursuit of this profession. For example, Fullan (1993) states that a teacher must have skills such as a developed personal vision, the ability to explore and collaborate with others, and be mature. In addition to mastering the professional and didactic knowledge necessary for a teacher’s career, Fullan speaks about skills that include a commitment to personal development (Fullan (1993), p. 23). In the “Green Paper on Teacher Education in Europe” (Buchberger, Campos, Kallos, and Stephenson, 2000, p. 19) we find a definition stating that the main components of a professional teacher education program might be the “studies in the sciences of the teaching profession (e.g., educational sciences, Didaktik/Fachdidaktik, literally translated as didactics and subject matter didactics, educational psychology, educational sociology). All of these are closely connected to educational research and aiming at the development of professional problem-solving capacity, a broad repertoire of validated practices to promote and support learning, and a professional code of ethic.”

In Slovenia, the development of teacher competencies, according to Marentič Požarnik (2006), is related to three components: cognitive, which encompasses knowledge and understanding; an action that envelops professional skills and emotional motivation which would determine the teacher’s attitudes and values, which must keep the individual competences in balance. The author, through the written text, lists five broad sets of competences: communication and relationships, effective teaching, organization and leadership, cooperation with the working and social en-

vironment, and, ultimately, professional development. Also, in connection with development of teacher competencies, as explained in the research by the Faculty of Education of the University of Ljubljana, conducted in 2004, the following competencies were identified as the most desirable for the teaching profession: knowledge of the content and methodology in the chosen field, ability to communicate, teamwork, flexible use of knowledge in practice, autonomy, (self-)criticality, self-reflection, (self-)evaluation, endeavor for quality, organizing active and independent learning, training students for effective learning (Razdevšek Pučko and Rugelj, 2006). When speaking about the qualities of the teacher, it is necessary to take into account the fact that we cannot overpower the personality traits of a teacher because, as the authors Kalin and Marentič Požarnik explain in a comprehensive way, the teacher’s professional development includes personal development, and one influences the other. This was also written by Pajak and Blase, 1989, p. 296, who found out that many teachers’ interpersonal relationships outside of school serve as important sources of support for their professional role. When one of these personal relationships place overwhelming demands upon the teacher’s time and energy, their impact becomes negative and the teachers might become isolated from their students and colleagues. Tickle (in Korthagen, 2004) speaks about people’s core personal qualities that are important for the teacher, and lists necessary traits for a successful teacher: creativity, trust, care, courage, sensitivity, decisiveness, spontaneity, commitment, and flexibility. A study conducted by S. Arnon and N. Reichel (2007), who also pointed out the inseparability of professional and personality traits, place in the center of an ideal teacher two basic categories:

1. The teacher’s personality whose personal qualities make him into an empathic and attentive teacher, a teacher in the role of a leader, a teacher with a positive attitude towards the profession, who possesses a wide-ranging, general knowledge in their chosen field and subject matter.

2. A teacher who has obtained professional, academic knowledge of the subject taught, such as: didactic knowledge, educational methodology, with a focus on an individual pupil, or, in other words, a teacher with a vast general knowledge that is also very well-versed in many other areas (p. 450, 451).

In identifying the qualities necessary for the teacher who can do his job well, we must

be careful that we, in the context of dealing with the professionalism of the teacher, do not consent to reducing the complexity of the teacher's profession to a list of competences and standards. Instead, the teacher should be considered as a whole personality, which is also pointed out by [Fullan and Hargreaves, 2000](#), p. 45. Although many would be tempted, the answer to the question "what qualities make a good teacher" cannot be found simply in the selection of some teachers' desirable, both personal and professional, characteristics as [M. Kovač Šebart \(2002\)](#) warns Slovenian Educational system about, and it can't be answered by looking only at the "competences," [Korthagen wrote in 2004](#). Problems should always be looked at in a multifaceted, objective way, and some consideration should also be given to factors such as environment, subject area, years of service, etc., and all this should be done in a wider context of studying teacher's professional development.

## 1.2. The purpose of the research study

Based on the theoretical starting points of the identified and mentions authors (such as [Beijaard, 1995](#), [Yung, 2001](#), [Muršak et al., 2011](#)) for the factors that influence teachers' professional development, we wanted to examine the extent to which teachers in Slovenian gymnasiums are qualified to perform the individual roles they encounter in their work and how the concept of self-application in teachers is influenced by factors such as years of service and the subject area. These are factors that significantly affect teachers' professional development, which is also shown by other research (eg. [Kunst et al. 2018](#)).

## 2. MATERIALS AND METHODS

The research involved teachers from 16 Slovenian general upper secondary education schools. The survey was conducted in November 2014, with a sample of 345 teachers (259, or 76.9%, were female, and 78, or 23.1%, were male) who taught 23 different subjects. The teachers' work experience ranged from 1 to 36 years (the average length of service was 19 years). The majority of teachers (277, or 81.0%) had a university degree.

To collect data, we created a question-

naire, which consisted of four parts. In the fourth part of the questionnaire, teachers were asked how qualified they felt to perform individual roles. There were six assertions related to the teachers' work. The teachers assessed their qualifications on a 4-point scale, where 1 meant "I'm under-qualified" and 4 "I'm very competent." In identifying teacher roles, we asked teachers how many individual descriptions were related to the role of teacher were involved in their work. Teachers were offered 68 assertions (see appendix) that specifically related to their work and were asked to assess on a 4-point scale how much each description applied, ranging from 1 (meaning "not at all") to 4 ("completely valid"). The data were processed with the SPSS 22.0 software package. The analysis of the variables showed that the distribution of all variables deviated statistically significantly from the standard. Therefore, we used nonparametric versions of statistical tests to check the differences between groups, the Mann-Whitney U test and the Kruskal-Wallis test. With confirmatory factor analysis using structural modeling of equations, we examined the basic assumption about the three dimensionality of the teacher's role, and in the measurement model, we identified seven latent factors, the dimensions of the role of the teacher: training in the profession and its integration into classes (PROF 1), legal-formal aspect of teachers' activity (PROF 2), accurate lesson planning (DID 1), consideration of class specifications (DID 2), educational-disciplinary behavior in class (PED 1), teacher's personal orientation (PED 2), and teacher's value orientation (PED 3). All required fit indicators (absolute ( $\chi^2 / df = 2.030$ ; Root Mean Square Error of Approximation (RMSEA = 0.055)), parsimony indicators (Parsimony Normed Fit Index (PNFI = 0.716)) and incremental indicators (Non-Normed Fit Index (NNFI = 0.919, CFI = 0.934)) indicated a good model fit, including that the predictive reliability and validity of the model were appropriate ([Makovec Radovan, 2017](#)).

### 3. RESULTS

**Table 1.** Teachers in the sample grouped according to Huberman's five stages of teacher career development

Years	Huberman's Phase	f	%
1–3	Survival and discovery	13	3,8
4–6	Stabilization	22	6,4
7–18	Experimentation/activism	133	38,8
19–30	Serenity' or 'conservatism	128	37,3
31+	Disengagement	47	13,7
<b>Total</b>		<b>343</b>	<b>100</b>

**Table 2.** Teachers' beliefs about their skills by Huberman's (1992) stages of professional development and years of service

Kruskal-Wallis Test													
'Survival and discovery'			'Stabilization'		'Experiment'/'Activism'		'Serenity' or 'conservatism'		'Disengage-ment'				
years 1–3			years 4–6		years 7–18		years 19–30		31 + years				
(N=13)			(n=22)		(N=133)		(N=124)		(N=45)				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>X</i> <sup>2</sup>	<i>df</i>	<i>p</i>
1	3,23	0,44	3,32	0,84	3,47	0,62	3,50	0,68	3,64	0,65	8,96	4	0,062
2	3,23	0,44	3,23	0,61	3,28	0,70	3,22	0,75	3,42	0,54	2,61	4	0,624
3	2,46	0,66	2,68	0,89	2,73	0,74	2,88	0,76	2,93	0,81	6,24	4	0,182
4	3,00	0,71	2,86	0,94	2,96	0,72	3,14	0,73	3,27	0,69	9,05	4	0,060
5	3,31	0,63	3,27	0,83	3,39	0,68	3,40	0,63	3,51	0,59	1,90	4	0,754
6	2,62	1,04	2,50	1,06	2,62	0,87	2,50	0,96	2,67	0,91	1,39	4	0,845

Note: M = Mean, SD = Standard deviation

1) Planning and implementing lessons, 2) Using different methods for instruction, 3) Solving educational-disciplinary issues, 4) Pedagogical activity, 5) Solving professional questions and dilemmas, 6) Publishing professional papers in the field of expertise they teach

Hypothesis about teachers' beliefs about their skills according to their work experience was examined with the Kruskal-Wallis test. There were no statistically significant differences between individual groups, which means that nothing can be said about the impact of years of service on teachers' beliefs about their own competence. Teachers with the most work experience assessed their qualifications as higher than teachers with less experience. In the assertions that the teachers felt most qualified to plan and implement lessons and to solve educational disciplinary problems, a trend of increasing estimates according to years of service was observed. For other assertions, this trend was not observed.

Before we present the results, we examine the teachers' work experience. We grouped the teachers into stages based on the teachers' work experience, according to Huberman's model of teacher career development. The greatest number of teachers (38.8%) were in the experimentation/activism and stock taking stage during which teachers "try to raise their influence, [as] they face the limitations of the system and look for new challenges" (Huberman, 1992, p. 127). Slightly fewer teachers (37.3%) were in the serenity or conservatism stage, during which teachers are more relaxed and received such things as they are (Huberman, 1992). Therefore, teachers with more experience dominated the sample.

Regardless of years of service, teachers felt the most qualified to perform a direct teaching role, as the teachers in the first three places made claims related to the performance of the lesson, the highest assessment of the assertion "Planning and implementing lessons" ( $\bar{x} = 3.49$ ), followed by the assertion "Solving professional questions and dilemmas" ( $\bar{x} = 3.40$ ) and "Using different methods for instruction" ( $\bar{x} = 3.27$ ). These assertions were followed by assertions related to the teacher's pedagogical activity: "Pedagogical activity" ( $\bar{x} = 3.06$ ) and "Solving educational disciplinary issues" ( $\bar{x} = 2.80$ ). Teachers felt qualified to publish professional contributions in the field they teach ( $\bar{x} = 2.58$ ). When we asked the respondents,

who state that they did not feel sufficiently trained, what areas of training they chose, because they felt that they were not sufficiently trained, 25.7% answered that they decided on education or training from their field of expertise, followed by education in the field of information and communication technology (10.0%), education in the field of special pedagogy, working with students with special needs or working with gifted students (6.1%),

“working in class, classroom management” (4.8%), and “educational disciplinary issues” (4.8%). The item was an open-ended question, to which the teachers freely wrote answers. The category of publishing professional papers in the field of expertise that had previously been considered the area in which the teachers felt the least qualified did not appear in the question areas and topics of education and training that teachers chose.

**Table 3.** Concepts of a teacher’s role by years of service

	years 1–3		years 4–6		years 7–18		years 19–30		31 + years		Kruskal-Wallis test		
	$\bar{x}$	$SD$	$\bar{x}$	$SD$	$\bar{x}$	$SD$	$\bar{x}$	$SD$	$\bar{x}$	$SD$	$\chi^2$	$df$	$p$
PROF1	3,21	0,628	3,49	0,397	3,32	0,511	3,43	0,486	3,51	0,511	8,849	4	0,065
PROF2	2,92	0,672	3,27	0,592	3,17	0,629	3,19	0,613	3,10	0,629	2,820	4	0,588
DID1	2,85	0,642	2,74	0,554	2,71	0,617	2,81	0,689	2,90	0,617	4,643	4	0,326
DID2	3,23	0,525	3,36	0,492	3,20	0,581	3,29	0,474	3,22	0,581	1,726	4	0,786
PED1	2,62	0,689	2,85	0,544	2,81	0,588	3,08	0,570	3,10	0,588	19,41	4	0,001
PED2	3,36	0,419	3,58	0,506	3,50	0,530	3,54	0,444	3,52	0,530	2,737	4	0,603
PED3	3,13	0,462	3,11	0,518	3,03	0,650	3,21	0,570	3,36	0,650	9,567	4	0,048

Note: PROF1=Training in the profession and its integration into classes, PROF2=Legal-formal aspect of teachers’ activity, DID1=Accurate lesson planning, DID2=Consideration of class specifications, PED1=Educational-disciplinary behavior in class, PED2=Teacher’s personal orientation, PED3=Teacher’s value orientation.

Hypothesis about concepts of a teacher’s role in terms of number of years of service was examined with the Kruskal-Wallis test. Statistically significant differences between individual groups were found in two dimensions: “Educational disciplinary behavior in class” (PED 1;  $\chi^2$  ( $p = 0.001$ ,  $df = 4.000$ ) = 19.410), in which teachers with more work experience were more involved in their work than teachers with less work experience. When the teachers assessed how many items in the dimension applied in their work, the ratings increased: The teachers with more work experience assessed the items more highly than teachers with less work experience. The second dimension in which statistically significant differences occurred was “Teacher’s value orientation” (PED 3;  $\chi^2$  ( $p = 0.048$ ,  $df = 4$ ) = 9.567): Teachers with more work experience attributed greater importance to this dimension. Teachers with more work experience, especially those with 19 to 30 years of service and between 31 and 40 years of service, emphasized the value of learning content in their classes, encouraged pupils to feel and experience art, and planned their lessons with a reflection on the educational effect of the content. Both dimensions, in which statisti-

cally significant differences occurred, are included in the construct Teacher’s Pedagogical Excellence. For other constructs with statistically significant differences, we did not record the teachers’ the length of service. In general, regardless of length of service, teachers rated the items in the dimension “Precise learning planning” (DID 1) the lowest.

In this study, we wanted to examine whether differences occurred in the conception of the role of the teacher among teachers regardless of subject area. Because of the wide range of subjects taught by the teachers surveyed, we classified the subjects into four categories: Language (Italian, Russian, Slovenian, German, English, French, Spanish, and Latin), Natural Sciences (physics, mathematics, chemistry, biology, and informatics), Social Sciences (psychology, history, sociology, geography, philosophy, and literary information knowledge and pedagogy), and Other (sports, fine arts, and music).



**Table 4.** Understanding the teacher's role with regard to the subject area

	the language		natural science subjects		social sciences		other		Kruskal-Wallis test		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	$\chi^2$	<i>df</i>	<i>p</i>
PROF1	3,44	0,432	3,27	0,589	3,39	0,484	3,44	0,514	4,563	3	0,207
PROF2	3,19	0,597	3,21	0,653	3,00	0,651	3,25	0,612	5,024	3	0,170
DID1	2,86	0,626	2,69	0,666	2,57	0,688	3,07	0,523	15,829	3	0,001
DID2	3,26	0,479	3,16	0,511	3,11	0,673	3,54	0,492	21,185	3	0,000
PED1	2,98	0,546	2,81	0,592	2,93	0,679	3,08	0,603	5,787	3	0,122
PED2	3,50	0,526	3,56	0,489	3,44	0,484	3,59	0,423	3,742	3	0,291
PED3	3,27	0,559	2,94	0,613	3,13	0,625	3,18	0,534	14,631	3	0,002

We also checked hypothesis about understanding the teacher's role regarding subject area with the Kruskal-Wallis test and found statistically significant differences between individual groups of objects in three dimensions: "Precise planning of lessons" (DID 1), ( $\chi^2$  ( $p = 0.001$ ,  $df = 3.000$ ) = 15.829). This dimension included the items "Detailed planning of teaching," "Structuring lessons after didactic stages," "Writing preparation for each lesson individually," and "Defining operational learning objectives for each lesson." The highest ratings were given by Other teachers, followed by Language teachers and then Natural Sciences teachers. The lowest-rated items in this dimension were by Social Sciences teachers.

The second dimension in which there were statistically significant differences is the dimension "Taking into account the specificity of a class" (DID 2), ( $\chi^2$  ( $p = 0.000$ ,  $df = 3.000$ ) = 21.185). Items "Adapting teaching to the individual characteristics of students" and "Taking into account the specificity of the class" were rated highest by Other teachers, followed by Language teachers and then Natural Sciences teachers. The lowest ratings were from Social Sciences teachers.

Statistically significant differences occurred in one dimension, "Teacher's value orientation" (PED 3), ( $\chi^2$  ( $p = 0.002$ ,  $df = 3.000$ ) = 14.631). "Teacher's reflection on the curriculum on the educational effect of the content," "Encouraging the sensitivity to experiencing or expressing works of art," and "Emphasizing the valuable dimension of learning content during classes" were assertions in this dimension. The Language teachers ranked the assertions the highest followed by Other teachers and Social Sciences teachers. Natural Sciences teachers ranked the assertions the lowest.

For other dimensions, there were no statistically significant differences between

teachers of different categories of subjects. The dimension "Teacher's personal orientation," which included the assertions "Clearly established rules of discipline and behavior in the classroom," "Consistency," and "Determination" of teachers, was rated higher than the other dimensions regardless of the teachers' subject area.

## 4. DISCUSSIONS

In the study, according to the theoretical starting points, we examined the extent to which teachers' professional development is influenced by belief in their own qualifications and factors such as length of service and subject area. The teachers were classified into five groups based on Huberman's model of professional development. In this sample, 3.8% of teachers had 1 to 3 years of work experience (survival and discovery), 6.4% had 4 to 6 years (stabilization), 38.8% had between 7 and 18 years (experimentation/activism and stock taking), 37.3% had 19 to 30 years (serenity or conservatism), and 13.7% had between 30 and 40 years (disengagement).

First, we wanted to examine the extent to which teachers feel qualified to perform a particular role, because we believe that a sense of competence can determine the perception of a particular role more than that which is more at the forefront of the teacher's work. We assumed that among the identified roles, teachers felt most qualified to perform a direct instructive role. Although statistically significant differences were not found, the results confirmed our assumption, as teachers ranked as the top three the items directly related to the implementation of the lesson: "Planning and implementing lessons ( $\bar{x} = 3.49$ ), "Solving professional questions and dilemmas" ( $\bar{x} = 3.40$ ), and "Using different methods for in-



struction" ( $\bar{x} = 3.27$ ). Fewer teachers feel that they are trained for educational activities, and very few to publish professional papers in the field of expertise they teach. Given the options offered, the teachers' choices seem somewhat logical, as the direct teaching role is the one in which teachers spend most of their time and which is ultimately their central task. The sense of competence is certainly influenced by teachers' knowledge of a particular field, a particular role. And of course, teachers who have more knowledge in a particular field also feel more competent in that area. Lachner et al. (2016) divided teachers' knowledge, on which effective learning is based, into three knowledge bases: knowledge of the content (where the teacher's deep understanding of the subject is taught, for example, understanding of concepts and principles that form a discipline); general pedagogical knowledge, which includes knowledge about the nature of learning, learning processes, and different teaching methods (knowledge that could be classified as teachers' didactic excellence); and pedagogical knowledge about content, which encompasses knowledge about how best to explain the content to pupils, as well as knowledge about possible misconceptions that may arise among pupils (this type of knowledge could be placed in our definition of teachers' didactic excellence). The sum of all three forms a teacher's qualifications and allows teachers to quickly identify important patterns in the classroom, based on which teachers also make decisions about the course of instruction (Putnam in Lachner et al., 2016, p. 198). More recent research into this knowledge added also competence in the use of information and communication technology (ICT), which complements the teacher's didactic competence (Radovan and Kristl, 2017). Lachner's finding also coincides with our assumption that the knowledge an individual has also influences his or her sense of competence, which has also been shown in the field for which teachers feel the least qualified: publishing professional papers in the field of expertise that they teach. Publication of professional contributions by teachers in Slovenia brings extra promotion points, but it is the task it is a task that teachers choose less often. Considering that in the study teachers stated that they feel the least qualified for this role, we checked whether the same topic appeared in the areas of education or training that the teachers chose most often. A review of the training showed that training or education where teachers acquire knowledge to publish professional contributions did not appear

among our respondents, which, in turn, indicated that teachers did not express interest in such training. Teacher training in publishing professional contributions is also ignored by the state. In the catalog of programs of further education and training of professional staff in education for the 2016/2017 school year, we did not find any training that addresses this topic. In addition to the aforementioned knowledge teachers should also possess at least a basic knowledge of methodology in order to be able to systematically monitor and analyze their own practice, as well as to introduce their work in their professional papers (Podgornik and Vogrinc, 2017, p. 11). By publishing professional papers, teachers share their experiences and knowledge with others, which is an excellent opportunity for examples of good practice to expand, with ideas and new knowledge acquired by other teachers. Against this background, and regarding the indicated shortcoming in teachers and taking into account that teachers can also gain promotion points, at the expense of publishing professional articles, it would certainly be sensible for teachers to be offered such education or training.

Among the study, we also assumed that when considering the role of a teacher, there would be differences in the subject area and the number of years of service of individual teachers, as the subject area and the teacher's work experience play an important role during a teacher's professional development. Thus, we assumed that teachers with more work experience would attribute greater importance to teachers' pedagogical excellence, which is mainly the educational dimension of the teacher's role. The results showed that statistically significant differences between groups occurred in two dimensions: "Educational-disciplinary behavior in the classroom" and "Teacher's value orientation." Both were classified as Teacher's Pedagogical Excellence. In interpreting the two roles, in which statistically significant differences were found, we used Huberman's career development model. Thus, for the dimension "Child-disciplinary behavior in class" as a "Teacher's value orientation," teachers in the serenity and conservatism and disengagement stages evaluated this dimension as more important in their work than teachers with less experience. The fourth stage of the Huberman model has two sub-types. The first is the stage of clarity, cheerfulness and distant relationships, which is characterized mainly as the result of the experiment stage (the third stage in the model)

and in which the gradual loss of energy and enthusiasm is compensated by greater self-reliance and self-acceptance (Valenčič Zuljan, 1999, p. 118). The second stage is characterized by a lack of enthusiasm and the reduction of professional ambitions (Lya Kremen Hayon in Beijaard, 1995). For teachers in the conservatism stage, serenity and tranquility are characteristic, but there may also be intensity (Huberman, 1992, p. 127). Based on this, the study results can be interpreted as the teachers in these two stages focus more on the educational dimension in the class. Of course, this does not mean that a teacher dedicates less attention to the educational curriculum of the lesson. Instead, more than in continuous tracking progress in native language, it is directed toward educational work with students, and where, ultimately, teachers who have gained rich experience over years of teaching also feel more confident, and therefore, are less likely to resort to formal measures, which are used more by teachers with fewer years of service. Similar findings were found in other studies. Zlatković et al. (2012) studied the role of the teacher in the learning process and found that older teachers feel more successful in their role as a regulator of social relations in the classroom, as well as in the role of a partner in emotional interaction with pupils. In addition, in the role of a partner in emotional interaction with pupils, teachers with several years of service have been evaluated as successful (see also p. 382). From the results, Zlatković and colleagues conclude that teachers with more experience and those with several years of work experience feel more competent to perform roles that mostly relate to social relationships in class and emotional (affective) communication (Zlatković et al. (2012), p. 382). An important part of the professional identity of the teacher is the subject the teacher teaches, as well as the teacher's awareness of the status of the subject that he or she teaches (Day, Kington, Stobart, and Sammons, 2006, p. 607). That is why we examined whether there is a difference in teachers' understanding of their own role in the subject area. The teachers were classified into four groups (Language, Natural Sciences, Social Sciences, and Other) based on subject area. Statistically significant differences occurred in three dimensions: "Precise planning of lessons," "Taking into account the specificity of a class," and "Teacher's value orientation." The first two dimensions fall into the construct Teacher's Didactic Excellence and the third in the Teacher's Pedagogical Excellence con-

struct. For the other dimensions, there were no statistically significant differences. The items in the dimensions Precise teaching planning and Teacher's value orientation were the highest evaluated by teachers from the category Others, followed by Language teachers and Natural Sciences teachers. The lowest rated in this dimension were Social Science teachers. Teachers in the Other category assessed the items that relate to the teacher's preparation for classes and their performance statistically significantly higher. The items on the questionnaire were universal, meaning that they were included in all subjects in gymnasiums. Therefore, we were surprised by the results for teachers of subjects that can be classified as in-between educational subjects: Great importance was attributed to the role of the teacher's didactic excellence. The third dimension, in which there were statistically significant differences, was rated the highest by Language teachers, followed by Other, Social Sciences, and Natural Sciences teachers. Poom-Valickis, 2012, p. 239 found that mathematics teachers more often use metaphors linked to the role of teachers as a didactic expert, and fewer metaphors that relate to the role of teacher as a pedagogic expert, while English teachers use metaphors linked to the role of the teacher as a didactic expert and the role of the teacher as a pedagogic expert, more equally. The author concluded that the differences are probably due to the nature of the subjects themselves and that mathematics teachers rely more on the didactic role of the teacher, because they need didactic knowledge in order to make math more interesting and accessible to students. We agree that teachers understand their role first through the subject they teach, which is why we also think that the study showed statistically significant differences. However, we would like to highlight another finding. Teachers in this study, irrespective of subject area, evaluated the items in the dimension "Teacher's personal orientation." These items were the assertions "I am resolute," "I am consistent," and "In the classroom, I have clearly set rules for discipline and behavior." These results show that teachers define their professional identity and consequently, their role through personality traits. Other authors who studied teachers' professional development, such as Kelchtermans (in Day et al., 2006) discussed self-esteem (how teachers describe themselves through their professional story) and the self-esteem of the teacher (self-reflection of the teacher, how one sees oneself or is seen by others). Beijaard et al. (2004),

however, stated that a teacher's professional identity contains personal and content perspectives, and teachers are expected to think and act professionally but not simply by internalizing the professional characteristics that include prescribed knowledge and behavior. Teachers differ (in the same way as the results of this study) in the way they face these characteristics, and the latter depends on how teachers personally agree with the traits (Beijaard et al. (2004), p. 122).

## 5. CONCLUSIONS

In the study, similarly to other authors (Goodson and Cole 1994, Volkmann and Anderson 1998), we proceeded from the starting point that one of the important elements on which teachers build their professional identity is the role they attribute to themselves. However, the key findings of this study can be summarized in three points: We found that teachers with several years of service experience feel better qualified to perform their duties. Most teachers feel qualified to perform tasks related to planning and teaching, followed by educational disciplinary behavior, and teachers, regardless of years of service, feel least qualified to write professional articles. When studying the impact of work experience on teachers' roles, we found that teachers with more work experience evaluated the assertions related to their educational activity, at the level of relationships and within the planning and delivery of lessons, statistically significantly higher than teachers with less work experience. On the first item, more experienced teachers rated items such as "to give students the opportunity to participate in the formulation of common rules in the classroom" and "to make decisions about resolving disciplinary offenses together with students" higher. In the context of content, however, teachers with more work experience responded that when planning their lessons, they also think about the educational effect that can be achieved through the content to emphasize the valuable dimension of the learning content in the discussion of the content and that students encourage sensitivity to experience artistic works and artistic expression.

In the framework of the research, we also identified the influence of the subject area on teachers' understanding of their own role as teachers. There were differences between teacher groups in different subject areas, which are those attributed to teachers of a

particular subject area of greater or lesser importance. Within the same research question, we also found that teachers define their professional identity and consequently, their role through their personality traits. This finding is important in the study of teachers' professional identity and their professional development, which shows that we must not ignore teachers' personality traits, as they play an important role in teachers' professional development and identity.

We also wanted to draw attention to the various aspects and factors that make up and determine the role of teachers, thus building together their professional identity and affecting their professional development. The latter begins with their education and then changes and upgrades during the career path. Therefore, it is important to equip future teachers with the necessary teaching and pedagogical skills at the university level as well. All three elements are equally important for teachers' performance. For the same reason, when studying teachers' professional development, all three elements should be treated equally. Teachers need to be aware of the factors that influence their professional identity and development. It is important that teachers pay attention to the changes that occur, that they are not afraid, and that teachers raise awareness and reflect to improve their performance, as well as reflect on their professional development.

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### Conflict of interests

The author declares no conflict of interest.

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## APPENDIX

Some examples of items related to work of the teacher:

I plan the lesson in detail.
I structure lessons after didactic stages.
I write preparation for each lesson individually.
I define operational learning objectives for each lesson.
When planning classroom work, I take into account the characteristics of students I teach.
I'm consistent.
I'm determined.
I give students the opportunity to participate in drawing up common rules in the classroom.
I constantly improve professionally.
I bring new developments from the field of my expertise into lessons.
In my professional pedagogical work, I strictly observe the formal framework of rules laid down by law and other documents.





## MENTORING IN TEACHING PROFESSION

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### ABSTRACT

Mentoring as a form of strengthening the competencies of teachers is widely accepted in the educational system of the Republic of Macedonia. Generally, experienced teachers and those who are new perceive this process as inevitable for strengthening and retaining quality staff. The goal is to explore what teachers think about mentoring novice teachers in teaching. In line with the stated goal, we tried to answer the following questions: Are there differences in teachers' views and opinions about the mentoring process regarding their work experience? Does mentoring as a process contribute to/for teachers' professional development? Are there differences in views and opinion of teachers for the mentoring process regarding their experience and involvement in the mentoring of novice teachers? The obtained results pointed to the weaknesses that the mentoring process in our country is facing with. Although mentoring as a process is regulated by law, in practice there are still inconsistencies in its realization, both from the aspect of the approach and from the aspect of effectiveness. The recommendation to schools is to try, in addition to mentoring, to offer other forms of support to novice teachers and to try to support the teaching profession through a continuous investment (staff and financial).

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## 1. INTRODUCTION

Mentoring is a complex, interactive process that takes place between people with different levels of experience and expertise, in which the expert (mentor) gives support to his colleague in order to become more efficient in the work and to contribute to the achievement of the goals of the institution in which he works. The ultimate goal of this process is professional development and career advancement (According to Carmin, 1988, as cited in [Hester and Setzer, 2013](#)). The mentoring process is an integral part of every sphere of life and work. Through this process: the general and specific work competencies of the mentee

are being promoted, emotional support is given and the knowledge, skills and experience of the mentor are transferred to the mentee, and this indirectly improves the quality of work in the institution itself.

Mentoring as a process has always existed in the sphere of education, regardless of the form in which it came through time (formal or informal). In the educational sphere, main participants in the mentoring process are the experienced teacher (teacher - mentor) and the beginner teacher – novice teacher, who mutually share knowledge, skills and experience. Essentially, this type of targeted interaction helps beginner teachers to become successful in their profession and to improve the results of their work in the long run ([Ingersoll and Kralik, 2004](#)). There is also research evidence that mentoring affects positively in terms of improving professional and vocational performance not only among novice teachers, but also among experienced teachers ([Washburn-Moses, 2010](#)).

Mentoring as a form of strengthening the competencies of teachers is widely accepted

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ed in the educational system of the Republic of Macedonia. Generally, the experienced teachers and those who are new perceive this process as inevitable to strengthen and retain quality staff. The mentoring process helps beginner teachers in a way that it facilitates the process of transition from studies to practice and helps them to turn the potential failure into success, and on the other hand, this process provides children with quality teaching. The value of the mentor is of great importance, but at the same time, the benefit that the mentor has in the process is important.

By definition, a mentor is an expert with experience that helps less experienced colleagues in further development of their competences ([Directions for mentoring and following the individual work of students, 2017](#)). In this process, the mentor tries to improve the skills of the novice teacher, skills that are already developed at the mentor itself. The role of the teacher - mentor is to help the novice teacher successfully pass the first year of his working experience as a teacher, through dedicated time to monitor, giving feedback, transferring good practices and leading conversations, acquiring professional experience, but also building views and values important in the teacher's profession ([Ristovska et. al., 2016, p. 8](#)). The whole process implies that there is a partnership between the mentor and the mentee. The novice teacher should see itself as a partner and colleague of his mentor. Throughout their cooperation, the mentor and the mentee should be guided by the following principles: confidentiality, availability, openness, optimism, efficiency, respect. A good mentoring process is characterized with: good planning, continuity, monitoring and feedback, reflexivity. The success of this process depends on the established relationship and collaboration between the mentee and the mentor ([Ristovska et. al., 2016](#)).

The people who serve as mentors are the foundation of any mentoring program. The quality of this foundation is determined by the way a district or school approaches three key program elements: Mentor Selection Criteria, Continuous Mentor Growth, Human Capital Structure ([Educator Effectiveness, January 2018 — Mentoring New Teachers, p. 2](#)).

Benefits from the mentoring process have all stakeholders: novice teachers, mentors and the school itself.

Benefits for the *novice teachers* are:

- He will become more secure in what he does and he will perform the teaching more competently, he will create a good working at-

mosphere in the classroom and he will create a good relationship with students, teachers and parents;

- He will learn to learn, to promote professional practice through learning from multiple sources and different approaches, exchange experiences and opinions with the mentor and other colleagues;

- He will acquire reflective skills for self-evaluation of the work and for using such knowledge to promote his own work;

- He will be introduced in the planning of its own professional development

- He will feel safer and more prepared for taking the professional exam

Benefits for the *mentors* are:

- To receive information about their own skills and on the basis of it to improve their own competencies;

- To enrich his professional experience and to develop professionally;

- To acquire the mentoring competencies necessary for advancement in the advisor's position.

Benefits for the *school* are:

- Gets professionally trained staff;
- Development of school culture;
- Upgrading and improving the skills and knowledge of the existing teaching staff;
- Interaction and cooperation between the staff ([Ristovska et al. 2016, p. 11](#); [Stevanovska, 2012](#)).

## 1.1. System of mentoring in Republic of Macedonia

In Republic of Macedonia, the mentoring process of new teachers in schools is regulated with the primary and secondary education laws, as well as with other bylaws.

Teachers who enter the educational process for the first time go through several stages, starting with monitoring mentor's work, realization of teaching under mentorship, to self-realization of what he has learned.

There are four categories and levels of jobs for employees – teachers in primary and secondary schools in the Republic of Macedonia, these are novice teacher, teacher, teacher - mentor and teacher - advisor ([Primary Education Law. Consolidated text p. 32](#); [Secondary Education Law. Consolidated text p. 30](#)).

The teacher progresses, moving one level to another, gaining the appropriate title:

from novice teacher, teacher, through teacher - mentor level, up to teacher - advisor. The Minister on the proposal of the Bureau of Education and Science and the Center for Vocational Education and Training prescribes the professional standards and method of acquisition of the titles teacher - mentor and teacher - advisor ([Law for teachers in primary and secondary schools. Consolidated text p. 8](#)).

A novice teacher is a person, who is employed for the first time in primary, i.e. public secondary school ([Primary Education Law. Consolidated text, p. 35](#); [Secondary Education Law. Consolidated text, p. 33](#)). Teacher's apprenticeship starts from the entry of the teacher-beginner in the classroom and lasts for one year. The novice teacher has his own mentor (a teacher appointed by the principal who teaches the same or affined subject with the novice teacher) from whom he learns throughout this entire period. During the apprenticeship period, the novice teacher with the help of his mentor works to strengthen the following six segments: knowledge about the subject and the educational system, teaching and learning, creating a stimulating learning environment, social and educational inclusion, communication and cooperation with family and community and professional development and professional cooperation ([Tasevska, Stojanov and Mickovska, 2016, p. 13](#)).

Novice teacher who has completed non-teaching studies is also obliged to attain apprenticeship, before taking the vocational exam, and before that, he must pass the pedagogical-psychological and methodical preparation (pedagogical qualification). This pedagogical qualification encompass passing the examinations of pedagogy, psychology, teaching methods, two elective subjects (from the list of offered elective subjects) and to realize 45 day practice in school ([Regulations for manners of following of the teaching process, exams for pedagogic, psychologic and methodic preparations, Official Gazette of the Republic of Macedonia, 56/2014](#)).

*Teacher – mentor* is a teacher who: must have at least 5 years of working experience as a teacher; at the last conducted integral evaluation, his work as a teacher should be evaluated with not less than four (4); and these teachers should satisfy a certain minimum of points for achieving the professional standards for teacher-mentor (points for teacher promotion can be received for: professional development, professional practice, professional cooperation and cooperation with family and community) ([Law for teachers in primary and](#)

[secondary schools. Consolidated text p.1-9](#)). For promotion in the title teacher-mentor, it is not enough just to be excellent teacher, expert in your field, but these teachers need to prove that they are leaders in the school and that from their engagement the whole collective in the school has a benefit ([Tasevska, Stojanov and Mickovska, 2016, p. 39](#)).

The mentor of the novice teacher is determined by the school principal, from the ranks of teachers i.e., the professional associates or educators who perform the work for which the novice teacher is trained and have the title teacher - mentor or teacher - advisor ([Primary Education Law. Consolidated text, p. 35](#); [Secondary Education Law. Consolidated text, p. 33](#)).

## 1.2. Duties of the teacher - mentor

The mentor needs to work with the mentee to establish an input-output process which is functional and sophisticated ([Guide to mentoring, 2012, p. 8](#)). The teacher-mentor has numerous responsibilities, and part of the duties related to the mentoring process of the novice teachers are ([Primary Education Law. Consolidated text, p. 35](#); [Law for teachers in primary and secondary schools. Consolidated text, p.11](#); <https://educiranje.wordpress.com>):

- To prepare a program that includes methodical, didactical and other preparation needed to train the teacher and for taking the exam;
- Prepares a report for the novice teacher work;
- Participates in the preparation of the school's development policies and performs other tasks in accordance with the acquired competencies for a teacher-mentor;
- To detect the initial needs of the novice teachers related with the first teaching classes and with the behavior towards students and parents, through timely holding meetings;
- To inform the novice teacher that he as a mentor is here for him and that he is free to contact him and ask for everything that interests him and is related to the teaching profession;
- To help him in the process of acquainting and acceptance. To create conditions the novice teacher to be treated as a professional by other teachers in the school collective;
- The novice teacher can come up with fresh ideas and knowledge related to the educational activity. The mentor should help him to put those ideas and knowledge into action,



i.e., their successful realization, of course, if they are good and applicable, not to neglect them and suppress them without giving him a chance to see how they would function and could be applied in practice.

### 1.3. Monitoring and evaluation of teachers work

Every three years, the State Educational Inspectorate performs integral evaluation of the educational work legality in the school and individually evaluate each teacher and professional staff. For teachers who plan to progress in higher title, it is very important to get a grade 4 or 5 by the State Educational Inspectorate, by which they will be entitled to apply for promotion to a higher title (Tasevska, Stojanov and Mickovska, 2016, p. 15). Recently (besides State Educational Inspectorate), the Bureau for Development of Education is in charge of monitoring the work of the teachers and professional staff, and will also play an important role in the assessment of the teachers because of their progress in the title teacher-mentor and teacher-advisor (Tasevska, Stojanov and Mickovska, 2016, p.16).

### 1.4. Financing

Apprenticeship lasts for one year. During the apprenticeship, the novice teacher is paid a salary equal to 80% of the salary of the teacher, of the professional staff, or the educator. During the apprenticeship, the mentor follows the novice teacher. For the mentor's work, the school pays a fee to the mentor in the amount of 10% of the salary that the novice teacher will receive after completion of the apprenticeship (Primary Education Law. Consolidated text, p. 35).

## 2. MATERIALS AND METHODS

**Subject of this research** are views and opinions of the teachers from primary and secondary schools in Republic of Macedonia, regarding the process of mentoring novice teachers in the teaching process and how it contributes to teacher's professional development.

**The purpose of the research** is to discover what teachers with different work experience, as well as teachers who have experience in mentoring novice teachers, think about the process of mentoring novice teachers

in teaching. In line with our goal, we tried to answer the following questions:

1. Are there differences in teacher's views and opinions for the mentoring process, regarding their work experience?

2. Does mentoring as a process contribute to/for teacher's professional development?

3. Are there differences in teacher's views and opinions for the mentoring process, regarding their experience and involvement in the process of mentoring novice teachers?

**The sample consists** 398 teachers (primary and subject teachers) from 28 city primary and secondary schools with approximately equal material-technical working conditions and with approximately equal social structure of students. Of these, 73.9% are female and 25.1% male. According to work experience, most of the teachers are with work experience of 6-15 years (37.7%), 21.6% have work experience over 25 years, 19 % have work experience of 16-25 years and 16.8% with work experience of 1-5 years. According to the working position, 40.2% are primary school teachers, 34.2 % are subject teachers in secondary school and 24.6% are subject teachers in primary school. Of the total number of respondents, 39.5% have been mentors of novice teachers.

Presented results are only one part of the project "*Professional Development of Teachers in the Republic of Macedonia - Conditions and Challenges*", realized within the Faculty of Educational Sciences, Goce Delcev University in Stip, Republic of Macedonia, 2016-2018. The goal of the project is to study the position and function of the system for teacher's professional development in Republic of Macedonia, analyzing: the pedagogical-organizational setup of the system for teacher's professional development; teacher's views and opinions regarding the functionality and applicability of the established system for professional development and their expectations from the institutions regarding this issue; factors that influence on the motivation for professional development; forms for professional development of teachers; individual needs for the type, manner and content of the professional development; satisfaction from their own level of professional development, as well as comparison with other models of professional development and proposal of a new national model.

For the purpose of the research, a survey questionnaire is used. In addition to the basic data (school, gender, position of the school, current position of the teachers, work experi-



ence, educational level) the questionnaire also contains, closed-type questions - an assessment scale where the teachers determine the level of agreement and satisfaction with the offered claims.

The obtained results are analyzed and

presented using the descriptive statistics: frequencies (f), percentage (%), and non-parametric procedure: analysis of variance (f-test) and t-test. The data obtained from the survey are processed using the statistical package SPSS 19.

### 3. RESULTS

**Table 1.** Difference between views of the teachers with different work experience, regarding the mentoring process of the novice teachers (ANOVA)

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Mentoring novice teachers and students – future teachers contributes to the professional development of the teachers	Between Groups	7,572	5	1,514	3,508	,004**
	Within Groups	168,786	391	,432		
	Total	176,358	396			
According to you, the way of realization of the mentoring process of the novice teachers in your school, contribute to the professional development of the mentor teachers.	Between Groups	19,234	5	3,847	3,077	,010*
	Within Groups	488,801	391	1,250		
	Total	508,035	396			
Mentor teachers should be specially trained for mentoring.	Between Groups	16,737	5	3,347	4,935	,000**
	Within Groups	265,228	391	,678		
	Total	281,965	396			
Potential teachers should spend the apprenticeship in the same classroom with their mentor	Between Groups	8,243	5	1,649	2,647	,023**
	Within Groups	243,490	391	,623		
	Total	251,733	396			
The school, apart from mentoring, should offer other forms of special support to novice teachers	Between Groups	6,312	5	1,262	4,937	,000**
	Within Groups	99,990	391	,256		
	Total	106,302	396			
According to which criteria in your school, the mentors for the novice teachers have been chosen?						
Teachers quality	Between Groups	15,944	5	3,189	2,333	,042*
	Within Groups	399,080	292	1,367		
	Total	415,023	297			
According to the principal's preference	Between Groups	21,692	5	4,338	2,760	,019*
	Within Groups	446,363	284	1,572		
	Total	468,055	289			

**Table 2.** Differences in the views and opinions among teachers who were and were not mentors for novice teachers in relation to the process of mentoring novice teachers (t-test)

Mentors		N	Mean	Std. Deviation	Std. Error Mean	T	Df	Sig. (2-tailed)
Mentor teachers haven't developed social skills for mentoring	да	131	2,71	1,154	,101	2,469	307	,014**
	не	178	2,38	1,188	,089			
Mentor teachers financially are not motivated enough to carry out this task	да	130	2,07	1,129	,099	-3,818	298	,000**
	не	170	2,59	1,195	,092			
According to you, the way if realization of mentoring novice teachers in your school contributes to the professional development of mentor teachers	да	157	2,09	,963	,077	-7,867	391	,000**
	не	236	2,94	1,105	,072			

\*p< 0.05 \*\*p<0.01

## 4. DISCUSSIONS

### 4.1. Teacher's views and opinions in correlation with their work experience

Differences in responses of the teachers with different work experience are analyzed using the F-test. The influence of the teachers' work experience on teacher's views for the set questions was statistically significant in almost all of the analyzed answers. This leads to the conclusion that teacher's work experience plays an important role regarding the estimation of the mentoring process of novice teachers, and how this process contributes to teacher's professional development. Statistically significant differences are at the level of 0.01 and 0.05 (Table 2).

#### 4.1.1. Differences in teacher's views and opinions about the mentoring process regarding their work experience

Major number of teachers (79%) agree that the current mentoring system for novice teachers needs to be improved.

For the question, *to indicate the weaknesses of the current mentoring process* (several views were offered), the surveyed teachers gave the following answers.

Regarding the fact that *mentor teachers do not have developed social skills for mentoring*, a large percentage (23.6%) of teachers do not agree at all with the view that mentor

teachers of novice teachers don't have developed social skills for mentoring.

A large proportion of teachers (30.4%) *fully agree that mentor teachers are not always able to follow the classes of the novice teachers, due to obligations in their own classroom*. At the same time, a large proportion (25.4%) agree that *mentor teachers often perceive this role as peripheral in their profession*. Regarding the view that mentor teachers are not financially motivated enough to perform this task, 26% of teachers fully agree, while 17% agree, which may be the reason why they experience mentoring as a peripheral obligation and do not regularly follow the classes of the novice teachers.

For the question, whether mentor teachers should be trained specifically for mentoring, a large proportion (49%) of teachers *agree* that they should be trained, and 35.4% *partly agree* that mentor teachers should be specially trained for mentoring. Statistically significant differences at the level of 0.01 on this issue is observed in the responses of novice teachers who *agree* with this and teachers with working experience of 16-25 years who *partially agree* with the view that mentor teachers should be specifically trained for mentoring of novice teachers. This corresponds with the recommendations given in the *Project for Professional and Career Development of Teachers in Republic of Macedonia* (Mickovska et al., 2013) where is express the need for preparation of a manual for preparation of a mentoring program and introduction of mandatory training for mentors.

The selection of the teacher-mentor for the novice teachers should be according to certain criteria. These criteria are noted in the Law for Teachers in Primary and Secondary

Schools. According to this, we were also interested in the opinion of the teachers included in the sample. For the question where the teachers were asked to determine, according to which criteria the mentors for novice teachers were selected in their schools, several views were offered on which the teachers gave the following answers:

For the offered views, 35% of the teachers agree that most often as a criterion is taken *the principal's preference*, the *length of the work experience of the teachers* (27.6%), the *teacher's cooperation* (21.1), and *quality of the teachers* (28.6%). While 37% of them consider that the in the selection of the teachers, the expressed wish of the teachers is rarest respected.

In some of these views, we have seen that there are statistically significant differences. Namely, they are perceived in the view for *teachers' quality*, where we found that older teachers (work experience over 25 years) *rarely* consider that quality is considered as a selection criterion, versus novice teachers who *often* consider that teachers quality is considered as a criterion for the choice for mentor teacher of the novice teachers.

Statistically significant differences at the level of 0.01 are also perceived in the view *according to the principal's preference*. Also in this view, the differences are noted/ determined between more experienced teachers (more than 25 years work experience) compared with novice teachers that has less year of working experience. In this regard, more experienced teachers consider that in process of selection of mentor teachers, the preferences of the principal are often used as main criteria for selection. Compared with them, novice teachers consider that such practice is rarely used (Table 1).

Whether novice teachers should spend their apprenticeship in the same classroom with their mentor is an issue in which the largest percentage (48.7%) of the respondents *partially agree*. Statistically significant differences at the level of 0.01 were observed in the responses of teachers with work experience of 16-25 years who *partly agree* that they should be together, and the novice teachers who agree that they should spend their apprenticeship in the same classroom with their mentor-teachers.

At the end, the teachers were asked for opinion *Whether school should offer other forms of special support, in addition to mentoring, as a support to novice teachers?* Statistically significant differences at the level of

0.01 were observed in the responses of novice teachers who agreed that the school should offer to novice teachers' support other than mentoring, unlike the rest, older teachers (with work experience over 16 years) who do not agree with that, that the school *should offer* another form of support.

#### **4.1.2. Differences in the views and opinions of teachers with different work experience, regarding whether mentoring as a process contributes for/to teachers' professional development**

Regarding the dilemma *does mentoring as a process contributes to the professional development of teachers*, teachers were asked the following questions: *Mentoring novice teachers and future students contributes to the professional development of teachers and According to you, the way of mentoring novice teachers in your school contributes to the professional development of mentor teachers* (Table 1).

In the first question, *Mentoring novice teachers and future students contributes to the professional development of teachers*, statistically significant differences were noted at the level of 0.01. Differences are noted in the responses of novice teachers who think that it *contributes a lot* to teachers' professional development, and teachers with 6-15 years' work experience who think that mentoring as a process *partly contributes* to their professional development.

Statistically significant differences at the level of 0.01 were also observed in the question where teachers were asked to answer *whether the way of mentoring novice teachers in your school contributes to the professional development of mentor teachers*. The biggest differences were noted among the responses of teachers with 1-5 years' work experience who believe that mentoring process implemented in their school *does not contribute* to their professional development, unlike older teachers (with work experience of 16-25 years) who consider it *partly contributes* to their professional development.

This response also corresponds with the remarks noted in the recommendations for improving the mentoring system in the Republic of Macedonia, where it is stated that apprenticeship is not carried out in a systematic way; there are no procedures and instruments for

promotion in titles and there is no evaluation system for professional development related to the system for promotion in titles. This is an indication that measures need to be taken in order to improve the existing and practicing the already proposed model of mentoring novice teachers, which would contribute to their better inclusion in the school life.

#### **4.2. Teacher's opinions and attitudes in relation with their experience and involvement in mentoring novice teachers**

Differences in teachers answers regarding their experience and their direct involvement in mentoring of the novice teachers in the teaching process, were analyzed using the t-test. The results that we received, showed statistically significant differences in some of the answers of the questions, that led to the conclusion that teacher involvement in the mentoring process of the novice teacher's influences on their positive attitudes towards mentoring as a process for involving novice teachers in the teaching process, and that this contributes to their professional development. The statistically significant differences are at the level of 0.01 (Table 3).

The results showed that a large proportion of teachers (79%) agreed that the current mentoring system for novice teachers should be improved. Regarding the offered statements in which the teachers were asked to indicate the weaknesses of the current mentoring system, we noticed certain differences between teachers. The differences are statistically significant at the level of 0.01 and are seen in the statements: *Mentor teachers have not developed social skills for mentoring and Mentor teachers financially are not motivated enough to carry out this task.*

Namely, with the statement that teachers have not developed social skills for mentoring *agree* teachers who have not been mentors until now, while teachers who were mentors *disagree* with this claim. In the second statement, it is expected that teachers who are mentors of novice teachers agree with the statement that financially are not motivated enough to carry out this task, unlike those who are not mentors who answered that they *disagree* that they are not financially motivated enough. Perhaps the funds they receive do not correspond with the obligations imposed on them as mentor teachers.

Regarding whether mentoring as a process contributes to the professional development of teachers, we noted that a large proportion of them (62.6%) think that mentoring novice teachers *partly contributes* to the professional development of teachers, and 28.4% that it *contributes a lot*.

Statistically significant differences between teachers who were and who were not mentors of novice teachers were obtained on the question in which they were asked to determine *whether the way of mentoring novice teachers in their school contributes to the professional development of teachers*. Positive attitude regarding this, that it contributes, consider teachers who already have experience in mentoring young future teachers, as opposed to teachers who haven't been mentors, who believed that it does not contribute to the professional development of teachers.

This attitude can be linked with the obligation of mentor teachers to prepare a report on the implementation of the mentoring program and for the achievement of the basic professional competencies of the novice teacher.

After completing the process of mentoring, mentor makes self-evaluation for the work he has done, so this serves for his professional and career development (Ristovska et al., 2016).

## **5. CONCLUSIONS**

Mentoring process is of particular importance for teachers who are at the beginning of their careers. Hence, the importance of novice teachers to receive mentor teachers who will be able with their own knowledge, skills and practical experience to introduce novice teachers into teaching profession and school life. Mentoring process creates a number of prerequisites for cooperation between novice teacher and teacher mentor. It is in favor of both the newly appointed teacher who draws experience and ideas from his colleagues as well as from the mentor who, in the framework of working with a new colleague at school, is given the opportunity to make sense of his own pedagogical practices, to analyze a number of situations in the professional sphere, which contributes to the enrichment of his / her professional skills.

The results of our research pointed to the weaknesses that the mentoring process in our country is facing with. Although mentoring as a process is regulated by law, in practice, there are still inconsistencies in its practical imple-



mentation.

Most teachers agree that in the current mentoring system of novice teachers, changes are needed. They emphasized the need to develop instruments and procedures for career advancement and a system for evaluating professional development, as well as greater financial motivation of mentor teachers, which could be achieved through the development of new financial plans for promotion in titles, which increases awareness of a more serious approach to mentoring as one of the ways for the professional and career development of teacher.

Novice teachers emphasize the need for more frequent contacts with their mentors, the need for greater attendance of the mentor teachers at their classes. Hence, it is recommended that schools, in addition to mentoring, should offer other forms of support to novice teachers and for the state to try to support the teaching profession through continuous investment (staffing and financial).

The main advantage of the research is that it proves that the relationships established between the mentor and the novice teacher are realized in formal and informal structures by supporting both the school leadership and the entire pedagogical team. The established teacher gives a strong start to the young teacher, sharing not only his classroom and extra-curricular experience but also his / her skills and attitudes.

In this context, the prospects for our next research on this scientific problem can be directed toward positive practices in the mentoring process, primarily in the countries of the region, and later wider, in order to adopt and implement them in our system.

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## Conflict of interests

The authors declare no conflict of interest.

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# BLENDING PEDAGOGY AND DIGITAL TECHNOLOGY TO TRANSFORM EDUCATIONAL ENVIRONMENT

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## ABSTRACT

This article shows efficacy of competences-oriented education model, representing effectiveness of pedagogy technology and digital tools blending in transforming education while using tutor's support. In correspondence to contemporary requirements and education system special features, connection between digital education tools and tutor technology contributing to students' key competences development is determined. The paper contributes to the field by summarizing some theoretical issues and offering implementation suggestions for effectively integrating digital technologies into teaching and learning. The use of digital technologies in educational activities opens up new opportunities, adequate methods for dissemination and management of digital information, development of necessary competencies on the basis of digital literacy, ensuring equitable access for all who wish to obtain necessary knowledge and decision-making skills, ensuring demand for school graduates in the world labor market in situation of digital economy. Innovative technologies become a problem adding difficulties to students' burden. Tutor becomes an intermediary between students and digital technologies to promote students' active learning practices; there are not so many students who can appreciate digital learning practices and get the most of it. The role of tutoring in digital literacy promotion is hard to overestimate. Tutor support is a pedagogical activity in individualization of education aimed at identifying and developing students' educational motives and interests. To form students' key competencies in education system, it is necessary to supplement traditional education with tools of digital educational technologies, new trends in pedagogies such as tutoring, which is becoming an integral part of modern learning process.

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## 1. INTRODUCTION

*"We... intend to multiply the output of experts in the field of digital economy, and, in fact, we have to solve a broader task, the task at the national level, to achieve universal digital literacy. To do this, it is necessary to seriously improve the education system at all levels: from elementary school to high-school*

*education, and to arrange digital training programs for people of all ages". (V.V. Putin, 2017)*

Digital technologies permeate the lives of 21<sup>st</sup> century citizens. Educators recognize the instructional potential of these technologies and are seeking ways to effectively utilize them in support of learning. In this paper we would like to contribute to the field by summarizing some theoretical issues and offering implementation suggestions for effectively integrating digital technologies in teaching and learning. The increased ubiquity and instructional advantages of education digitalization have made teachers use it in their classroom in order to keep up with the modern trends in education without even evaluating as to how beneficial digital technologies are for their students.

"In their quest on being effective, ed-

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ucators have always experimented with the art of teaching. Teaching has evolved over centuries by adopting new approaches, methods, tools, and technologies to reach a wider audience” (Akbar, 2016). With new technologies it is very important not only to evaluate their influence on students, but also to combine these new trends with some traditional ones, methods known and being successful in education for years. Although teachers should definitely understand that education should utilize whatever science has to offer and follow suit, but in doing so they should not be carried away with all the innovations and new technologies no matter how well they are right for a particular class. Besides, new approaches in education create new challenges both to teachers and students.

Digital technologies are widely spread in educational institutions of all levels in the 21<sup>st</sup> century. Educators recognize the instructional potential of these technologies and still are looking for their efficient use with students. In this paper we would like to contribute to the field by summarizing some theoretical issues and offering implementation suggestions for effectively integrating digital technologies into teaching and learning.

At the same time, undoubtedly, further digitization should ensure the improvement of the quality of education, since it becomes possible to substantially increase the amount of resources available for use in the educational process.

Today, the educational space is growing rapidly and expanding due to the development of the digital environment: electronic textbooks are being created, educational platforms appear and are developing, the number of open online courses is measured in thousands and the number of their consumers is measured in millions. Distance education has already become a part of our life.

The question is if teachers have enough high-quality content to fill the “digital capacities” that arise on a regular basis. Undoubtedly, in the use of digital technologies, there are great opportunities for schools, universities and additional education for children and adults. However, not all electronic resources make an impression of serious and high-quality ones.

Transformation in any field is never easy, in education especially, so we’ve proposed to put together pedagogical strategies and digital technology tools that can help along the way. In this paper we will briefly describe some of innovative teaching strategies used in high-

school education along with problems and challenges they pose on students and teachers. Using digital technologies in education has become a response to these challenges. Modernization of education system is aimed at training an individual who has developed a high level of key competencies. The use of digital technologies in educational activities opens up new opportunities, adequate methods for the transfer, dissemination and management of digital information, the development of the necessary competencies on the basis of digital literacy, ensuring equitable access for all those who wish to obtain the necessary knowledge and decision-making skills, ensuring the demand for high-school graduates in the world labor market in situation of digital economy.

Competence-oriented education evolves at the expense of qualitative transformation not only of educational processes, but also of all aspects of teaching and learning activities, due to the opportunities offered by modern educational technologies, and take into account the following principal characteristic features:

- information exchange and functional interconnection of education tasks and goals;
- need to unify and harmonize the activities of various units while solving the majority of education tasks and goals;
- use of digital technologies in the learning process in particular and educational development in general (Makarova, Makarova, 2008).

Traditional teaching technologies also face challenges due to teaching styles changes and digital teaching resources emergence. Universities are starting to offer Internet access to students and teachers. All kinds of gadgets are allowed in a classroom: from a desktop computer to palm-size devices students can use instead of a dictionary, calculator or projector.

But there is an underside to all these technological advances and innovative technologies. Many teachers are so obsessed with new digital technologies they forget that they might become a rival to a teacher.

There is an opinion that in 5-7 years paper textbooks will disappear. They might remain in advanced schools. How exactly will the program be implemented? Will the paper textbook be digitized and placed in students’ tablets? Or will fundamentally different textbooks be created? These advanced textbooks will follow students’ progress and new educational material mastering. They will probably choose how fast the students should advance, assess how well the material has been learned,

look for the forms of students' interaction in order to get them interested in quality performance. Besides, with these digital textbooks students will always be in a psychologically comfortable learning environment.

It is clear that with such a textbook, the teacher will soon become redundant and be virtually expelled from the educational process. Perhaps teachers will check if everything is okay with students, or change the textbook when it is over. If only a textbook is not programmed to track learning effectiveness!

In a nutshell, in 10 years' time the introduction of digital technologies will have a follow up, and the role of the teacher will undergo a global rethinking as students will no longer need to go to class. They will stay at home and study using their magical textbook. In a really positive scenario, a teacher-controller will remotely check whether the student has passed the material, how much time he spent on it, and what difficulties he has experienced in the process of studying. All of these might be used for improving a digital textbook quality.

There is one drawback in this futuristic scenario – students will never develop what we call the skills of the 21<sup>st</sup> century: the ability to communicate with other people, or team work skills. For these skills development students' interaction is absolutely necessary to create an environment in which communicative competences are to be developed in addition to the active and interactive learning process.

So it all depends on how well teachers can combine innovative digital technologies with real teaching in the course of which students learn how to deal with the advantages offered by digital sources of information without causing damage to their argumentation or inquiring skills.

We live in a media-enriched world, so we have to use these unique opportunities to 'learn anytime and anywhere', but should not forget that our human "dynamics are becoming more and more at risk with the addictive dimension brought about by the ubiquitous presence of digital devices and social media in students' lives" (Pedro, de Oliveira Barbosa, Santos, 2018), the latter is usually associated with mobile learning.

Highly appreciated by both students and teachers, digital technologies are often seen as a remedy in themselves to many problems of education. But technologies themselves can become a problem, adding difficulties to students' and teachers' burden in high-school institution. Tutor support in digital education can become an intermediary between students

and digital technologies and promote students' active learning practices. So the role of tutors in digital literacy promotion is hard to overestimate.

In the academic year of 2017-2018, research work on digital educational resources development, testing, use and blending it with a tutor support in education institutions continues. For more successful development and use of digital educational resources in the teaching and learning processes, the tutor needs to become acquainted with the requirements for the digital educational resources, their typology and content. Digital educational resources are digitized photos, video fragments, static and dynamic models, objects of virtual reality and interactive modeling, cartographic materials, sound recordings, symbolic objects and business graphics, text documents and other educational materials necessary for the organization of the teaching process.

In accordance with general requirements for digital educational resources, they should:

- correspond to the content of text-books and meet the requirements in normative acts of the Ministry of Education and Science of the Russian Federation;
- focus on modern forms and methods of education; provide high interactivity and multimedia characteristics;
- ensure the possibility of tier differentiation and individualization of education; take into account students' age and psychological needs and the corresponding differences in cultural experience;
- offer types of learning activities that guide students to acquire experience in solving life problems based on knowledge and skills within the subject;
- ensure the use of both independent and group work;
- contain variants of educational planning, assuming a modular structure;
- be based on reliable information and data;
- exceed the corresponding sections of the textbook by volume, without expanding the thematic sections;
- be fully reproduced on the declared technical platforms;
- provide the opportunity to use other programs in parallel with the digital educational resources;
- have a user-friendly interface.

Digital educational resources should not:

- represent additional chapters to the ex-



isting textbook;

- duplicate the public reference, popular science, culture, information;
- based on materials that are out of date (obsolete information and data).

The analysis of research work concerning organization of a competency-oriented educational process in the education system showed that they reflect the issues of developing a graduate's key competencies. To form trainees' key competencies in the education system, it is necessary to supplement traditional education with tools of digital educational technologies, new trends in pedagogies such as tutoring, which is becoming an integral part of modern learning process. The social component of competence is the ability to make an adequate decision in a specific situation. The cultural component of the competence includes professional ethics, business negotiations, and team work ability. Within the framework of the intercultural approach, the main task of modern education is personality and self-awareness development as a result of the acquisition of a new social and cultural experience.

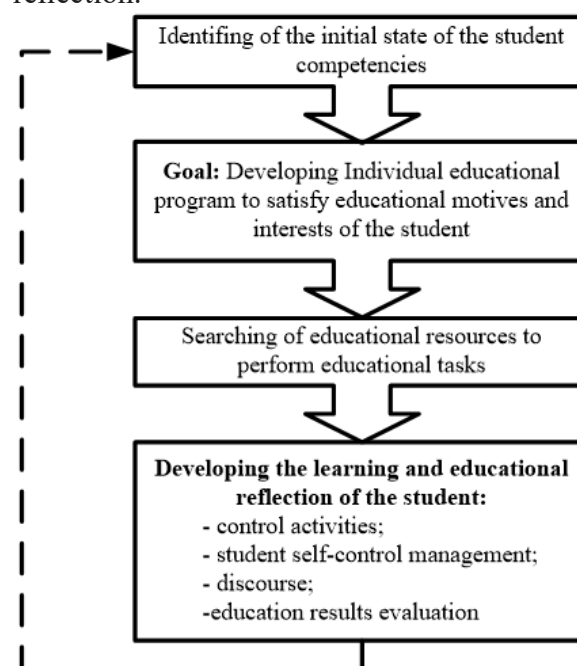
Modern theories of blended learning describe definitions ranging from a mixture of digital technologies to a combination of pedagogical approaches. Oliver M. and Tigwell K. (Oliver, Tigwell, 2005) propose combination of four learning theories: constructivism, behaviorism, connectivism and cognitivism, to meet challenges and to optimize students' learning process; Graham C. (Graham, 2006) proposes media definition in terms of their role within pedagogical framework. Stacey E. and Gerbic P. (Stacey, Gerbic, 2009) describe blended learning a beneficial for students combination of 'face-to-face and online learning'. Macdonald J. (Macdonald, 2006) defines blended learning as a face-to-face and distance learning that would acquire 'Tutorial Mode' in which students receive the digitalized teaching and learning materials and electronic textbooks (on different devices) and also have a face-to-face tutorial contact with instructors, tutors and other academic staff on campus.

## 2. MATERIALS AND METHODS

Digitalization as one of the characteristics of education process openness and availability requires a revision of approaches to the organization of the educational process and its staffing. For modern education, special training of staff is needed, based on the definition

of their competencies and taking into account the changing role of the teacher in the modern educational process. In the conditions of open education, the teacher not only represents the information, but also organizes the activity of the students to obtain this information. He does not only explain and present the material, but also answers the questions. He mustn't only give out prepared instruction for the task, but also provides help in discussing possible solutions with the students. The information extracted in such a joint activity turns into a personal knowledge of the learner, and the teacher who works this way becomes a tutor.

Tutor support is a pedagogical activity in the individualization of education aimed at identifying and developing students' educational motives and interests, searching educational resources for creating an individual educational program, working with the educational order of the student's family, and developing student's learning and educational reflection.



**Figure 1.** The activity of the teacher (tutor) during digital educational process development

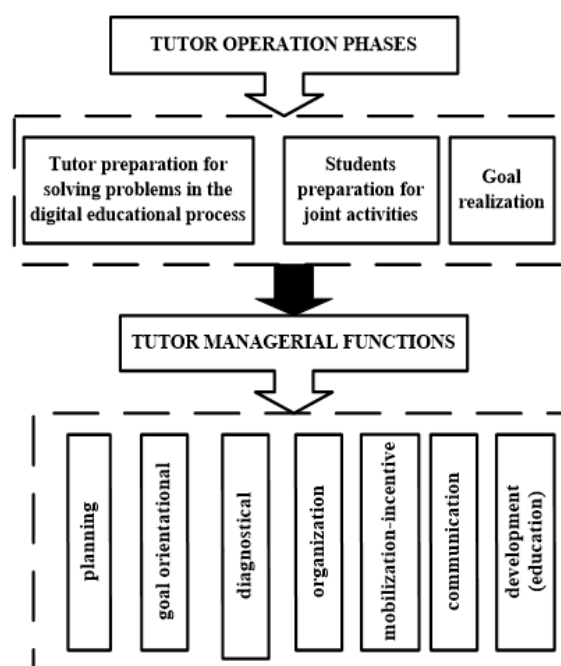
The managerial activity of the teacher (tutor) can be represented in the form of blocks: identifying the initial state of knowledge, skills, goalsetting, determining the main learning strategy, setting tactical tasks, monitoring, managing the self-control of trainees, feedback, and, finally, evaluating the results of the learning process (see Fig. 1). Despite the major role of the teacher as a manager in experimental training, we consider the activ-



ity of learners, the mobilization of intellectual, volitional efforts and emotional experiences as the basis of the digital educational process.

The tutor should be competent in the subject, it is good to know the content and structure of the course and teaching materials (not being their author), be able to assess their quality, necessarily interact with the author of the digital course or expert (experts) in the given subject area, be able to apply pedagogical technologies in the organization learning activities. The professional activity of the tutor should:

- stimulate the development of students' independent activity taking into account the psychological and pedagogical requirements for education and training;
- analyze own activities with a view to improving it and upgrading skills;
- know the basics of social psychology, psychology of interpersonal relationships, and psychology of large and small groups;
- know the objective links of education, upbringing and development of the individual in educational processes and society;
- master modern educational technologies, methods of applying pedagogical theory in various spheres of life;
- possess the forms of business correspondence, the skills of preparing text documents;
- master the norms of official and business written speech, international and national standards of types and varieties of official documents;
- study the characteristic ways and methods of selecting linguistic material in accordance with various types of speech communication;
- be able to edit the text, focused on this or that form of speech communication;
- own the skills of independent generation of stylistically motivated text, be able to work with original literature on the specialty; have the skill of working with a reference sources.



**Figure 2.** Tutor managerial activities

Considering tutor managerial activities (Fig. 2) primarily as an interaction, it is possible to clarify the content of communication competences, using the suggestions of specialists in the field of social interaction competences:

- to demonstrate ability to plan individual or group activities, to develop cooperation;
- to interact in various roles (limiting, supporting, developing), avoiding destructive interaction;
- to encourage trust, tolerance, empathy, respect for human rights and freedoms, reflection in cooperation with students.

At the same time, it is important that the content of the educational resources, the forms, methods and means of education at each new stage correspond to the real and potential needs of the trainees, meet their personal senses, and as a result act as a motivating factor of the learning process development. The personality of the trainee, the teacher and the learning process are combined into a complex self-organizing system that can exist and function in an interactive educational environment that promotes the development of key competences, creativity and self-learning of the student.

The ability to form key competences in the teaching process is an important task for teachers at the present stage. The analysis of available and projected key competencies allows definition of individual educational

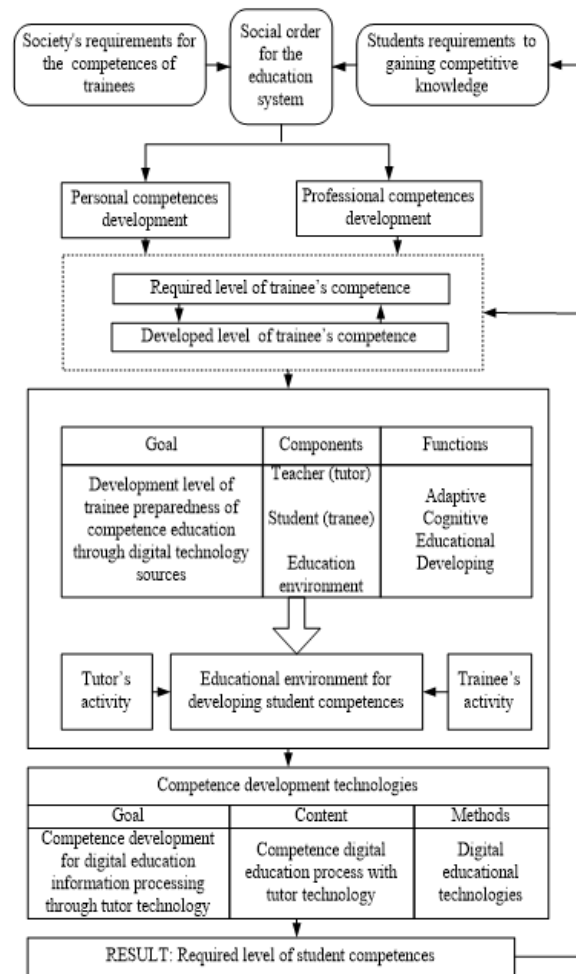
strategies, choice of adequate interactive educational technologies, determination of mechanisms of internal and external evaluation of a trainee.

When making a decision, the person's fundamental reaction to the emerging situation and the functioning of the brain in the decision-making mode explains the causes of the emergence of extreme situations and clearly demonstrates that the problem of using effective innovative educational technologies in the educational process is mainly of a psychological nature. Permission is largely reduced to the ability to manage emotions in order to prevent imbalances and to acquire skills to control the level of emotional load of trainees. It is about the ability to ensure the functioning of the brain in the optimal condition.

The necessity of solving this problem in connection with the increasing role of independent work of trainees in the modern educational process is explained by the following:

- educational process organization makes it possible to develop creative abilities and to join the research approach of new material studying;
- increasing the amount of information that can not be fully presented during lecture classes;
- educational process organization allows to prepare better and more qualitatively for tests and examinations.

High level of trainees' independence is provided by interactive digital educational technologies. For example, the activity of the students in the independent creation of business sessions, as one of the varieties of business games, promotes the assimilation of theoretical knowledge, the development of creative thinking, the acquisition of professional and practical skills and the preparation for stressful situations associated with decision-making while using digital educational resources (Makarova, Makarova, 2017).



**Figure 3.** Competence model of digital education process on basis of tutor technology

When considering the basic principles of digital educational process development, (Fig. 3), the goal is trainees' independent learning, the following provisions can be proposed:

- transition to a qualitatively new level of the relationship between the teacher and the trainee, based on changing their personal positions, resulting in a partnership in educational activities;
- educational activity becomes a new type of activity for the creation of the digital educational process from the position of the manager of the process of training trainees;
- system of educational activities becomes one in which interactive digital educational technologies, productive and creative tasks play a leading role.

Thus, in organizing tutoring activities, it is necessary to take the characteristics of the learner into account, such as:

#### 1. The need for justification

- students pay attention to the rationale

(why they need this particular course or section).

- students will spare no time and energy to understand why and whether it is worth spending time and energy on studying the subject that is being offered to them.

## **2. The need for independence**

- ability to make decisions independently, to bear responsibility for them is the main feature of the behavior and self-awareness.

- when a student enters the learning environment, a controversial situation arises: a person is sort of thrown back, into his own past, when, sitting on a school bench, he was directly or indirectly dependent on the teacher. Therefore, adult learners should be given the opportunity to choose from several alternatives and to make their own choice.

## **3. Practical orientation**

The tutor has the opportunity to interact with fellow tutors, participating in permanent Internet conferences of tutors, visiting Tutor schools, various seminars, author's workshops, conferences. With the help of these specialists, students are moving away from the general, the collective to the private and education becomes individually directed. The development of tutoring should contribute to the development of teachers' staff, effectively solving the task of preparing the younger generation for life in the information society.

# **3. RESULTS**

Diagnostics of the experiment on the organization of digital education process on the basis of tutor technology was carried out in the process of questioning, interviews, observations during class periods, and also on the basis of learning outcomes and testing the key competences development. To assess the effectiveness of the organization of this digital educational process, a system was used to question students in the experimental (ExGr-58 students) and control (CGr - 56 students) groups. An analysis of the information obtained indicates that the majority of students showed low rates of professional competencies (elementary level - CGr-39.8, ExGr-40.9, advanced level-CGr-46.3, ExGr-31.8, high level-CGr - 13.9, ExGr-27.3)

As part of our study, a program was developed on the basis of the Lyceum No. 4 in Taganrog, which allows using interactive teaching technologies to organize a digital educational process. The purpose of this program is to develop the ability of students to

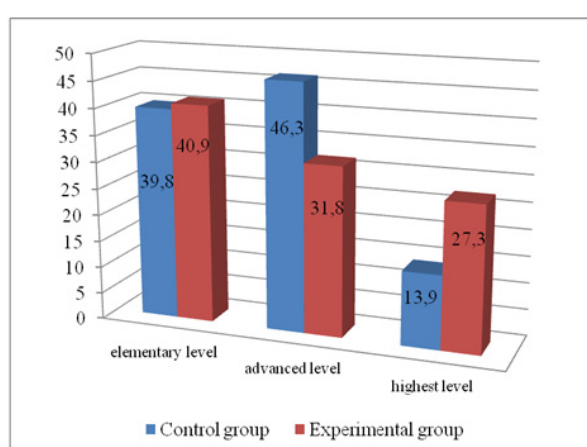
independently find one or another method, depending on the nature of the material being studied and the educational task. The use of interactive educational technologies in the process of students teaching, in particular, tutoring technology, is designed for 10-11 classes and covers specialized disciplines, since vertical and horizontal communications are used, ensuring the interdisciplinarity of this system. The opportunity to work with electronic resources of the system is provided to students in a distance learning center, in computer classes, from home computers with Internet access. It should be noted that testing is possible only in specialized computer classes of the Lyceum. The educational resources of a digital educational process are used as a supplement to traditional forms and methods of teaching. They allow teachers to activate the independent work of students in the study of various disciplines, to improve the quality of their knowledge. The most important features of the described program that should be considered are openness and universality. Openness lies in the fact that it not only provides training resources to any user, but also gives teachers unlimited opportunities for the development of digital teaching materials for any school discipline. Universality is ensured by the fact that tutoring technology allows using all known methods of interactive learning. Using a universal integrated database makes it easy to expand the training program.

During the final testing, students of control (CGr) and experimental groups (ExGr) showed the following results of professional competencies development (elementary level - CGr-27, y, ExGr-10.2, advanced level-CGr-45.4, ExGr-43.4, high level-CGr - 27.3, ExGr-46.4).

Comparison of the statistical data of the ascertaining and control stages of the experiment, presented in Table 1, convincingly testifies the development of the competence of future specialists in the organization of a digital educational process using interactive technologies.

**Table 1.** Comparison of the findings at the ascertaining and control stages of the experiment

Development level (%)	Competences			
	Control group (N=56)		Experimental group (N=58)	
	Beginning of experiment	End of experiment	Beginning of experiment	End of experiment
elementary level	39,8	27,3	40,9	10,2
advanced level	46,3	45,4	31,8	43,4
highest level	13,9	27,3	27,3	46,4



**Figure 4.** Comparison of the findings at the ascertaining stage of the experiment

In general, experimental groups differ significantly with higher results in all the indicators being evaluated (Fig. 4-5), which indicate the effectiveness of the pilot work and the authors' chosen strategy of organizing a digital education process on the basis of tutor technology.

## 4. DISCUSSIONS

Summarizing all of the above in this section, we can conclude that:

1. Digital educational technologies are the most promising ways to improve the competence-oriented learning process, based on the principles of problem modeling, distinguishing it from the traditional methods of the education system.

2. The studied domestic and foreign research shows that blending of digital educational tools and innovative teaching technologies is an intensive way to increase

the effectiveness of trainees' independent work, not at the expense of the volume of processed information increase, but due to the depth and speed of its processing.

3. The activity of trainees, arising in the framework of such blending is long-time and stable, and the decisions taken independently are creative in content and emotionally colored.

## 5. CONCLUSIONS

In general, blending digital educational tools with innovative teaching technologies in teaching and learning process helps trainees improve their skills and gain experience in the following areas: identifying, selecting and solving problems; work with information - understanding the meaning of the details described in the situation; analysis and synthesis of information and arguments; work with assumptions and conclusions; evaluation of alternatives; making decisions; discussing issues and understanding other people (team work skills); consideration of problems associated with the implementation of learning management decisions; presentation of team work results; correlation of theories and concepts in the learning process and in real life activities; the coordination of conflicting goals; interactive learning; skills of conceptualizing experience; reflexive skills; skills of operational self-determination in the division of labor; self-esteem and awareness development.

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## Conflict of interests

The authors declare no conflict of interest.

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# METHODOLOGICAL PERFORMANCE EVALUATION BY TEACHERS IN PRESCHOOL EDUCATIONAL INSTITUTIONS

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assessment technology,  
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## ABSTRACT

The article describes a technology of teachers' assessment of methodological performance as an aspect of preschool educational establishment management. Theoretical methods have been the major problem research methods: analysis of normative legal documents; theoretical and methodological analysis; system analysis; design approach; empirical methods: ascertaining experiment, questionnaire survey, interviews with preschool teachers. The authors have determined a theoretical and methodological framework for the study of the problem of effective methodological performance evaluation by teachers in preschool educational institutions; principles of implementing this technology have been proposed. In addition to the methodological performance evaluation technology by teachers, which includes research and monitoring stages and a decision-making stage, the authors have developed implementation charts for assessing methodological performance by teachers in preschool educational establishments and defined the criterion and level characteristics of methodological performance. Carrying out the procedure for assessing methodological performance in a PEI will ensure support for the organization's processes, as well as facilitate a transfer of the organization from a merely functioning state to the state of dynamic development.

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## 1. INTRODUCTION

The relevance of this study is determined by insufficiently developed technological support for the process of methodological performance management in a preschool educational establishment, a lack of scientifically based diagnostic tools to involve teachers of

preschool educational institutions (PEIs) to assessing the methodological performance.

The primary objective of the state educational policy of the Russian Federation within the framework of implementing the federal state educational standard for preschool education and the 'Teacher' occupational standard is to provide the up-to-date quality of preschool education ([Order No. 544n. \(2013\)](#)).

The quality of preschool education is in turn ensured by the quality of teaching staff, their respective training in the process of higher education, in the process of further training and proficiency enhancement of education officers.

One of such forms of work is methodological work in a preschool educational institution. Methodological work holds a spe-

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cific place in a PEI management system and is closely related to major purposes and core management functions. Its pivotal role is manifested in promoting the human element – teachers' personalities and creative activities. The main reference points for methodological work in a kindergarten are: a guided quantum growth of each teacher's professional skills; an increase in integration capabilities of the whole team; a quality of the educational process in a PEI.

Achieving these benchmarks is impossible without quality management of methodological performance in a PEI. Methodological performance is inextricably linked with consumers of this educational service, that is, the teachers of a PEI, their needs, and also the degree of their satisfaction. The current state educational policy is aimed at "inclusion of educational service consumers in assessing the quality of these services". This is evidenced by legal and organizational documents of recent years. However, despite considerable achievements in terms of theoretical development of the problem of assessing the general education quality, there are no technologies for assessing methodological performance by teachers as an aspect of preschool educational establishment management in PEI practice; criterion and diagnostic tools for teachers' assessment of this type of activity have not been elaborated either. This fact determines the relevance of the specified problem – the need for technological support for the process of methodological performance assessment by teachers of a preschool educational establishment as an aspect of PEI management.

The desire to adjust this difference has impelled the authors to develop a technology for methodological performance assessment by teachers in a PEI, which determined the main goal of the research.

The purpose of the research is to develop a technology for assessing methodological performance by teachers as an aspect of preschool educational institution management.

The research objectives include:

- to reveal the state of the problem in scientific literature and practice;
- to describe the technology of teachers' assessment of methodological performance as an aspect of PEI management in the form of an appraisal practice program that would reveal common tasks, logic and content of appraisal stages;
- to develop implementation charts and criterion and diagnostic tools for assessing methodological performance by teachers as an

aspect of PEI management.

The current state policy in the field of preschool education is aimed at arranging conditions for ensuring the quality of all structural components of preschool education, including such a component as teaching staff. A competently organized methodological work contributes to the perfection of their professionalism and expertise. This is evidenced by legal and organizational documents of recent years.

The Federal Law 'On Education in the Russian Federation' detailing the concept of 'Management of the Educational System' (Article 89, Clauses 2.6, 2.7) includes, in addition to 'state regulation of educational activities' (licensing procedures for educational activities, state accreditation of educational activities, state control (supervision) in the field of education), 'independent evaluation of the quality of education, public and non-government professional accreditation' (FZ-273, 2012). Thus, it is worth noting that in the educational policy, there is a shift in emphasis towards supporting the implementation of evaluation procedures that assess the quality of education through public and professional communities. 'Inclusion of consumers of educational services in the assessment of the educational system activity' becomes topical (the Government Program of the Russian Federation 'Development of Education for 2013-2020').

An important document is undoubtedly 'Recommendations for the use of tools in public and professional assessment of the preschool education quality' developed by the Federal State Autonomous Institution 'Federal Institute for Education Development' (FSAI FIED) as part of activities in the field of 'Modernization and implementation of a modern evaluation system and improving the quality of preschool education in preschool educational institutions in accordance with the federal educational standard for preschool education as part of support of development programs of regional municipal preschool education systems' (MES RF Letter No. 01-00-05/541. 2015). The authors of the recommendations defined a mechanism that presupposes a two-phase quality assessment system, where self-evaluation of a PEI acts as a first step (first phase), including teachers' assessment of methodological performance in a PEI.

Attempts to solve the problem of assessing the quality of various life activity structures of educational institutions are being undertaken today by both theoretical scientists

and pedagogical practitioners.

The theoretical foundation of the research is constituted by:

- Theoretical developments in the field of methodological work organization in an educational institution (Ezopova, 2003; Mayer, 2002; Potashnik and Moiseev, 1997; Slastenin and Podymova, 2007; Taranova, 2012; and others);

- Theoretical developments in the field of preschool education quality management (Bagautdinova et al., 2015; Bogoslovets and Mayer, 2013; Koroleva, 2014; Safonova, 2004; Svatalova and Yakovleva, 2015; Stepanova et al., 2017; Taratukhina and Shirokova, 2013; and others).

Analysis of psychological and pedagogical literature has shown that today methodological work is construed as 'part of professional pedagogical (professional managerial) activity, within the framework of which theoretical products that ensure pedagogical or administrative actions are mastered, examined and developed' (Slastenin and Podymova, 2007).

Penetration of management theory into preschool education, division of subjects and objects of PEI management, definition of managerial activity areas from in terms of object (personnel management (human resources), material and technical base management, etc.) have made it possible to define methodological work as one of the managerial activity areas, as a special activity in which the actors ensure coherence of teachers' joint methodological activities and their focus on achieving educational goals through planning, organization, management and monitoring (Bagautdinova et al., 2015; Bogoslovets and Mayer, 2013).

The object of research is methodological work as an aspect of educational institution management, as an interconnected set of elements ('interrelated measures, actions and efforts') that in conjunction reveal the consistency of the methodological activity of a PEI teaching staff and are aimed at ensuring sound preschool education (Bagautdinova et al., 2015). A leading part is assigned to methodological work in a PEI in the process of intensifying pedagogical work, developing teachers' professional competence and activating interaction with parents (Stepanova et al., 2017).

An important management function is quantity and quality record and result monitoring. Since management process takes place in a continually changing environment and is characterized by varying degrees of uncertain-

ty, monitoring could prove how much administrative action has reached the desired goals, what adjustments managerial decisions need and whether they do at all; which aspects of management 'sink', and which require further development and improvement. In the management theory, what is considered the most optimal is monitoring exercised through feedback, which provides quantitative and qualitative assessment of collective performance and an institution's performance record (Svatalova and Yakovleva, 2015). Thus, it can be concluded that effectively organized monitoring is primarily focused on solving strategic tasks and on eventual deliverables and should be simple, evident and convincing for each agent. In addition, the effectiveness of the monitoring managerial function is determined by its compliance with the requirements that the modern management theory has developed, namely, how operational, transparent and objective it is.

The scope of research is assessment by teachers of methodological performance in a PEI.

When solving the problem of assessing methodological performance in PEIs, according to the authors, it is appropriate to consider the monitoring function as a reference point of the management cycle linking it to the analysis and planning functions since control is the primary way of feedback and, therefore, a means of obtaining information with reference to which management process is carried out.

The concept of 'methodological performance in a PEI' does not have an unambiguous definition. The authors proceed from the fact that researchers (Safonova, 2004) consider the quality of education as satisfying the needs of consumers for educational services, its compliance with certain standards or specifications.

A definition proposed by Potashnik and Moiseev, (1997: 33) is essentially valuable in this context; when interpreting it, one can note that methodological performance is a relationship of a goal and a result as a measure of achieving goals, while goals (results) of methodological work are given only operationally and predicted in the area of teachers' potential development. At the same time, he points to the need to evaluate 'at what price (at the cost of what losses, efforts) these results are achieved. It is either the absence or minimization of negative consequences in methodological work organization, that is, in all cases, it does not imply achieving any good, but rather the maximum possible result with baseline

minimum labor, energy, time, etc. cost; in other words, we are referring to optimal results’.

Thus, methodological performance, according to this author’s concept, is ‘a ratio of a predicted goal and a result’ (Potashnik and Moiseev, 1997: 34). Moreover, when ascertaining methodological performance, two points should be taken into account: first, the thesis that methodological performance, as a certain phenomenon and attribute of the educational process, has a design nature, that is, it can and should be the subject of designing work of any management actor (from a teacher to the head of a PEI); second, it is the use of forecasting method that (unlike any other similar states: foreshadowing, guessing, foresight, foretelling, anticipation, etc.) is a scientific method that can be learned (Potashnik and Moiseev, 1997: 34).

Quality is a complex concept. In this regard, methodological performance is a complex characteristic reflecting the effectiveness of all aspects of methodological work: developing a strategy, planning, organizing and directing this process, encouraging teachers, monitoring and correcting their methodological activities, etc. (Mayer, 2002). The most important component of the whole quality system of methodological work is the product quality. The quality of methodological products is a component and a consequence of performance; it is determined by teachers’ proficiency level in a PEI. It is important that the formation of product quality begins at the stage of its planning (Koroleva, 2014).

From the standpoint of qualimetry and system characteristics of methodological work, methodological performance is understood as a set of properties that meet the needs of participants in methodological work (that is, teachers) and the requirements of standardized documents.

Based on the analysis of papers in the field of education quality management (Bagautdinova et al., 2015, Koroleva, 2014; Stepanova et al., 2017; Taranova, 2012; Taratukhina and Shirokova, 2013, etc.), the authors have defined the structure of methodological performance:

- the quality of methodological deliverables in a preschool educational institution (teacher satisfaction with advanced training);
- the methodological performance as a supporting process for teachers (teacher satisfaction with methodological work organization in the PEI, quality of forms and methods of methodological work, variability of methodological work forms);

- the quality of conditions created in a preschool educational establishment for effective methodological work organization (in terms of personnel (in the person of senior teacher), material, technical, informational, didactical aspects, etc.), openness of the methodological work system, its interaction with other social institutions.

The process of methodological performance management is considered as special control organized and aimed at achieving well-defined results of this type of activity predicted with a possible degree of accuracy. Since methodological performance management also includes managerial activities (goal-setting, forecasting, design, organization, monitoring), the quality management of methodological work should be viewed as a systematic, integrated and organized working process aimed at continuous quality improvement (Ezopova, 2003; Mayer, 2002).

For this research, the core thesis of qualimetric approach on recognizing the feasibility of quantitative measurement of both any individual properties and their combinations, including complex or integral quality, which methodological performance is, has been important. An evaluation in general terms is judgments about a particular phenomenon presented in a qualitative or quantitative form. The concepts of ‘assessment’ and ‘evaluation’ are fundamental in measurement theory and can be used in pedagogical activity (Taranova, 2012; Taratukhina and Shirokova, 2013).

The essence of qualimetric approach is manifested in its principles. The principles of qualimetric approach include the following: informativeness, integrity, optimality, accuracy, conclusiveness, producibility, accessibility and others. The principle of producibility has served as the basis for developing a technology for assessing methodological performance by teachers as an aspect of preschool educational institution management.

The academic literature analysis has allowed the authors to state the problems that a preschool educational institution must solve in order to ensure high methodological performance:

1. To learn to correctly forecast, design, simulate qualities (properties) of teacher training that a PEI expects to receive ‘at the output’ as a result of advanced training process in the methodological framework, that is, to determine the goals of methodological work and the quality of methodological work required in the future.
2. To achieve and to maintain a required



level of methodological performance, timely preventing undesirable deviations from it.

3. To improve methodological performance, bringing it in line with demanding requirements of regulatory documents. Improving methodological performance and any new properties emerging therein are possible only through an innovative process.

4. To identify and assess factual methodological performance, its compliance with the required standards.

Development of methodological performance in a PEI is possible only if the system is evaluated for efficiency, and its further development is predicted.

## 2. MATERIALS AND METHODS

Theoretical methods were essential methods to investigate this problem: analysis of regulatory documents to prove the relevance of the formulated problem; theoretical and methodological analysis to determine reference points of this study; system analysis for a holistic examination of the scope of research; method of design to develop a technology for assessing methodological performance by teachers as an aspect of preschool educational institution management. To confirm the relevance of the problem, empirical methods were used: ascertaining experiment, questionnaire survey, interviews with PEI teachers.

The questionnaire included questions concerning conditions created in the PEI for teachers' methodological work, their participation in various forms of methodological work, as well as the issue of involving teachers in assessing methodological performance in the PEI.

In course of the questionnaire survey, teachers were asked to assess their satisfaction with the methodological performance in the PEI on a scale from one to three: a) fully satisfied; b) partially satisfied; c) not satisfied. The respondents filled out questionnaires by themselves.

The results obtained during the first set of the ascertaining experiment confirm that personnel development is carried out both in the preschool educational establishment and beyond it, covers self-educational activity of teachers, their preparation for certification, includes exchange and communication of pedagogical experience, is aimed at addressing tasks of the educational institution and professional activities of teachers. This is evidenced by findings of the questionnaire and interviews

with teachers.

The second set of the ascertaining experiment was aimed at identifying the existing mechanism for assessing the methodological performance. With the help of questionnaires and interviews, the authors were able to establish: senior teachers assess the methodological activities of teachers. But the procedure for assessing the quality of planning and organization of methodological work by teachers of preschool educational institutions has not been properly organized. At the same time, all senior teachers realize the importance of feedback and would like to have information about the quality of methodological work management, but almost none of them take measures for this since there are no tools for such work.

Thus, identifying actual state of things in terms of the problem under consideration in science and of preschool educational institutions has served as the basis for developing a technology for assessing methodological performance in a PEI.

In this research, teachers of preschool educational institutions were subjects of methodological performance assessment.

The sample size includes 108 people. These are teachers and experts of preschool educational organizations in Magnitogorsk.

Among them:

- 57% have higher education;
- 18% have incomplete higher education;
- 25% have secondary pedagogical education.

Of the total number of respondents:

- 52% of respondents have worked with children for over 20 years;
- 28% of respondents have worked with children for over 10 years;
- 20% of respondents have worked with children up to 10 years.

## 3. RESULTS

Development of a technology for assessing methodological performance by teachers as an aspect of preschool educational establishment management has become the study outcome. The technology is a program (algorithm) of evaluation activity revealing common tasks, logic and content of evaluation stages. The technology for assessing methodological management in a PEI includes three stages: the research and monitoring stages and the decision-making stage (Table 1).

**Table 1.** Technology of methodological performance assessment in a PEI

Stage	Objectives at the stage	Scope of the stage
First stage: research	Laying down quality assessment parameters for the management object (methodological work).	This stage is associated with defining the structure and array of criteria, quality indicator constants, levels and methods for calculating integrated assessment.
Second stage: monitoring	Measuring the results of the management object's activity (methodological work).	The stage is associated with integrated assessment of methodological performance on the basis of a knowledge-based chart. Qualimetric monitoring is used to ensure transformation of information about methodological deliverables in educational institutions, its structuring and improvement (development).
Third stage: decision-making	Managerial influence on the monitoring result involves transition to other management functions (analysis, forecasting, etc.), drawing conclusions and formulating proposals for further development of methodological work.	This analysis stage is transitional to the planning function: the conclusions and proposals made in its course are included into an analytical justification for the planning documents. Depending on the conclusions and proposals made, the goals and objectives of methodological work for the next life period of a PEI are formed. Based on the goal setting results, necessary measures and terms for their implementation are developed.

At the first stage, a system of criteria and indicators is developed, levels and methods for calculating an integrated assessment are identified, as well as mechanisms for measuring parameters (criteria and indices) characterizing methodological performance in a PEI.

The second stage is monitoring. The stage is connected with an integrated assessment of methodological performance on the basis of an implementation chart.

The task is to assess the manifestation

degree of methodological performance indicators with the help of evaluation forms, that is, implementation charts that serve as technological support for the methodological performance assessment process.

The authors have developed implementation charts for assessing methodological performance in a PEI (Table 2). It is possible to use them on paper, but a more effective way would be to develop software to assess methodological performance.

**Table 2.** Implementation chart for methodological performance assessment in a PEI

Indices	Indicators	Points	Total score	Validation
1	2	3	4	5
<i>Criterion 1: Effectiveness of the PEI personnel development</i>				
1.1 1.1 Does methodological work contribute to the desire to approve and set up in teaching profession?	- no - yes	0 2		
1.1. Is your record service taken into account in the organization of advanced training in the PEI? <i>Describe how this is taken into account in this activity organization by the senior teacher (for example: tutoring, a plan for individual self-education, etc.)</i>	- yes - no	0 2		
1.2. What are your professional achievements related to proficiency enhancement? <i>Please instantiate (for example, participation in workshops, in the operation of a district methodological center, in a professional skill competition, etc.).</i>	- none - in certain areas - in all areas	0 1 2		
1.3. How does the organization of advanced training in the PEI affect the certification process? <i>Give specific examples.</i>	- no - partially - they are highly correlated	0 1 2		
1.4. Are you satisfied with the advanced training outcomes in the PEI? <i>Show through the presence/absence of professional achievements and failures.</i>	- no - partially - completely	0 1 2		
1.5. What amount of methodological materials have you released over the past year? <i>Name the most significant ones.</i>	- from 1 to 2 - from 3 to 5 - 6 and more	0 1 2		
1.6. Are other types of continuing education used: self-education, attendance of advanced training courses? <i>Indicate what results were achieved with the use of these professional development forms.</i>	- no, - where appropriate - yes	0 1 2		
1.7. What is the degree of public availability of information on advanced training about conferences, competitions, etc.? <i>Provide specific examples (websites, media, booklets, advertising in other media).</i>	- low - average - high	0 1 2		

<b>Criterion 2: Organization of methodological work in the PEI</b>		
2.1. Are you familiar with the methodological work plan for the year?	- no - yes	0 2
2.2. Do you have a plan for your own methodological work?	- no - yes	0 2
2.3. Does the scope of methodological work match your scientific and practical achievements and meet your occupational needs? <i>Give an example of personnel development measures the content of which proved useful to you in your professional activities.</i>	- no - partially - completely	0 1 2
2.4. Are innovations being introduced into methodological work? <i>Give examples of raising awareness or introduction of new programs and educational technologies.</i>	- no - sometimes - yes	0 1 2
2.5. Are the forms of continuing education updated? <i>Give an example of an event that you remember and why.</i>	- no - partially - systematically	0 1 2
2.6. Do you participate as an organizer of training events for professional development of the PEI teachers? <i>List the activities you hold in the framework of personnel development.</i>	- no - sometimes - yes	0 1 2
2.7. Does the senior teacher measure your level of proficiency? <i>Do you agree with the assessment of the senior teacher? Ground your opinion.</i>	- no - sometimes - yes	0 1 2
2.8. Is the professional skill development of the PEI teachers monitored? <i>What is the dynamics of your professional development according to monitoring data?</i>	- no - yes	0 2
2.9. Is advanced pedagogical experience identified, studied and shared in the kindergarten? <i>Give an example of this kind of activity.</i>	- no - yes	0 2
<b>Criterion 3. Quality of conditions for methodological efficiency</b>		
3.1. Does the level of professional competence of the senior teacher conform to the ongoing measures to upgrade the internal skills in the preschool institution? <i>Provide specific examples (an event helped to complete certification, to participate in competitions, etc.)</i>	- no - sometimes - yes	0 1 2
3.2. How efficiently is the curriculum office in the preschool institution used as a resource center for further teacher training? <i>List what, how, when you use as an example.</i>	- inefficiently - efficiently	0 2
3.3. Is the curriculum office equipped with everything required for effective teachers' professional activities, including ICT? <i>Give an example of the most popular educational tools.</i>	- no - sometimes - yes	0 1 2
3.4. In your opinion, is the database of methodological products in the PEI an effective resource? <i>Give an example of effectiveness of a methodological products database.</i>	- no - sometimes - yes	0 1 2
3.5. Is there basic pre-school general education curriculum available?	- no - yes	0 2
3.6. Is there a set of modern guidebooks (for teachers, parents, and children) that support implementation of the basic pre-school general education curriculum?	- no - partially - yes	0 1 2
3.7. Has the PEI established partnership with other organizations in the field of methodological work? <i>List examples with whom the PEI partnerships have been established.</i>	- no - partially - yes	0 1 2
Efficiency coefficient = A/MP    MP=48    A=    A=		



The third stage is decision-making. At this stage, based on monitoring information, analytical materials and public reports are prepared. Analytical materials are a form of a generalized presentation of the education quality evaluation findings, whereby individual evaluations of participants may not be mentioned at all or used as solitary instances. Analytical materials can be designed as information graphics or as a text document. Examples of textual analytical materials are public reports and statements on methodological deliverables and prospects of educational institution and system activities.

## 4. DISCUSSIONS

The 'Teacher' occupational standard clarifies the concepts of 'criteria and indices' and introduces the concept of 'indicator'. "Criteria for quality assessment are an aggregate attribute that serves as a basis for quality assessment formation. An index is a characteristic of a teacher's activity that is observable and measurable, indicative of the effectiveness and quality of their performance and enabling to calculate the quality indicator upon a selected criterion. An indicator is objective information, normally quantitative, indicative of a teacher's performance results in a certain period according to a certain criterion" (Order No. 544n. (2013)).

In this paper, the following criteria have been singled out:

- quality of methodological deliverables;
- quality of methodological support process for teachers;
- quality of methodological environment.

Each criterion, therefore, is revealed through a system of indices and indicators forming criterion and diagnostic tools for assessing methodological performance.

With respect to teachers' assessment of methodological performance, the authors have applied the following principles:

- conformity of quality estimation criteria with factual methodological activity;
- simplicity of calculations;
- measurability of indicators;
- moderate quantitative representation of indicators.

Measurement of parameters characterizing of methodological performance according to the degree of their compliance with the requirements of regulatory documents (scaling) is the prominent mechanism. Scaling is

the simplest and most accessible measurement model. It assumes that the procedure for determining a parameter compliance with the requirements of regulatory documents is reflected in a verbal, descriptive form:

- complies (yes);
- partially complies (in part);
- does not comply (no).

The composite scores for each of the criteria, for a group of indicators, for all indicators characterizing methodological performance should be compared with a permissible range of scores. A mathematical model for processing the measurement of parameters characterizing the quality of preschool education ensures the highest objectivity based on scores.

Conclusion on the methodological performance level in a PEI is drawn by comparing the scores obtained through the following level scale:

- from 0 to 16 points – a low level;
- from 17 to 33 points – an allowable (average) level;
- from 34 to 48 points – an optimal (high, creative) level.

The efficiency coefficient is a ratio of the actually scored number of points to the maximum possible. In this case, the levels are defined as follows:

- from 0.00 to 0.33 – a critical (low) level;
- from 0.34 to 0.69 – an allowable level;
- from 0.70 to 1.00 – an optimal level.

When filling in an implementation chart for assessing methodological performance in a PEI, attention should be paid to the following methodological recommendations.

1. An implementation chart for assessing methodological performance in a PEI has been developed on the basis of federal and regional regulatory acts and other documents that specify requirements for the educational process implementation.

2. In order to monitor methodological performance, it is suggested that the chart should be filled in by the same group of educators. This will make it possible to obtain results in the dynamics of their development, to compare them and to make timely correction of processes within the framework of methodological work.

3. When filling in the implementation chart, it is possible to introduce a 'weighting coefficient'. The implementation chart is filled in as follows: the points related to a selected criterion are multiplied by the 'weighting co-

efficient', and the resulting product is indicated in the column 'Actual score'.

4. In the column 'Validation', a reference can be given to various local regulatory acts and other documents that regulate activities related to the organization of methodological work in a preschool educational institution (PEI):

- orders (on establishing a Coordination Council for the PEI development program implementation, on convening working groups for implementation of the Federal State Educational Standard in preschool education, on approval of an educational establishment curriculum to improve the proficiency level of executive and teaching employees, on exercising internal control over the Federal State Educational Standard implementation; on modifications to job descriptions of executive and teaching employees; on approval of new or revised job descriptions; on approval of a methodological work plan, etc.);

- regulations (on working groups, on the internal audit procedure, etc.);

- agreements (to cooperate with social actors, etc.);

- plans (methodological work, proficiency enhancement for executive and teaching employees, etc.);

- minutes (meetings of the PEI council, the governing council, the supervisory board, meetings of agencies where the issues of introducing amendments and additions to the content of Regulations and Procedures, meetings of the teachers' council, the teacher-parents meetings, etc. were considered);

- lists (of documents included in the bank of normative and legal documents at the federal and regional levels, referenced information resources with e-mail addresses indicated, etc.);

- information certificates (on the quantitative and qualitative composition of teaching staff indicating the ratio of executive and teaching employees who have received further training, on the costing calculation and formation mechanism necessary for implementation of principal vocational educational programs, on the PEI funding standards; on the amount of additionally raised financial resources; on the PEI equipment; on compliance of the material and technical base with the principal educational program implementation; on staffing level of the curriculum office, etc.);

- website URLs and e-mails of the PEI;

- miscellaneous.

The methods used in measuring the parameters characterizing methodological per-

formance are as follows: analysis (of data, documentation, etc.); expert reviews; interviews; study of methodological activity products; data collection, formalization, grouping, processing, etc.

Depending on the conclusions and proposals made, goals and objectives for methodological work for the next life period of a PEI are formed.

## 5. CONCLUSIONS

Methodological performance is an important performance indicator of a preschool educational establishment. Methodological performance cannot be effectively managed without feedback, without studying consumer satisfaction with this educational service, without methodological performance evaluation by teachers as an aspect of preschool educational institution management. The analysis of scientific literature and regulatory documents indicates the need to engage consumers of services in assessment of their quality. However, the ascertaining stage of the experiment has shown the lack of a technology available for methodological performance assessment by teachers as an aspect of preschool educational institution management.

Development of a technology for teachers' assessment of methodological performance as an aspect of preschool educational institution management was the goal of the research.

The technology has been developed taking into account the Russian Federation legislation and allows maximum recognition of teacher methodological activity specifics in a PEI, provides an opportunity for monitoring studies to evaluate methodological performance and to design a system of methodological assistance and support based on the results obtained.

The technology is an evaluation activity program that reveals common tasks, logic and content of evaluation stages.

The first stage – research – is related to defining criteria, performance indices, quality indicators, levels, methods for an integrated assessment of methodological performance as an aspect of preschool educational institution management. Developed on the basis of federal and regional regulatory acts applying requirements to the educational process implementation, the criterion and diagnostic tools reflect the essential features of methodological activity; they also meet the requirements of

measurability indicators, moderate quantitative composition of indicators, and simplicity of calculations. The criterion and diagnostic toolkit presented in the form of a knowledge-based chart serves as a mechanism for assessing methodological performance in a PEI.

The second stage – monitoring – is related to measurement of methodological deliverables and to an integrated assessment of methodological performance on the basis of a knowledge-based chart. The knowledge-based chart serves as a basis for monitoring methodological performance. Filling in the chart by the same group of teachers makes it possible to obtain results in the dynamics of their development, to compare them and make a timely correction of processes in the framework of methodological work.

The third stage – decision-making – is transitional to the planning function: the conclusions and proposals made in its course are included into an analytical justification for the planning documents. Assessment of methodological performance in a preschool educational establishment by teachers gives a clear picture of the teachers' satisfaction level with the organization and content of methodological work, displays problems and potential of methodological work in the establishment, and accordingly maps out development options for the preschool educational establishment. On the basis of database collected during the expert evaluation, it is possible to define work priorities and at the same time to reduce efforts to develop quality, while making it foreseeable and feasible.

Application of the technology for methodological performance assessment by teachers as an aspect of preschool educational institution management allows one:

- first, to present systematically the objectives and expected deliverables of the teachers' methodological activity of a preschool institution, requirements to the process and conditions for accomplishment of the objectives;

- second, to increase the role of formalized information in methodological work management in a PEI receiving estimates both for individual and group indicators of methodological work and for its integrated assessment. Unlike verbal information, formalized information is more accurate, less subject to an influence of judgmental factors in its interpretation, can be transformed by mathematical methods, it is easier to systematize, store, and reuse;

- third, to make the management process

more specific premised on methodological performance indicators that can act as through parameters for the monitoring, analysis, planning and organization functions;

- fourth, to create an information base for a management actor about the object on the basis of methodological performance assessment.

Evaluation of methodological performance is intended:

- to acquire objective information about the activity state in a PEI;

- to acquire objective information about the activity management state in a PEI as a whole and methodological work, in particular;

- to acquire objective information about the activity state of teachers of different levels (its conditions, process and deliverables) in a PEI;

- to reveal positive and negative trends in teachers' methodological activity;

- to determine the causes for improvement or deterioration in the quality of teachers' methodological activity in different periods of their work.

Methodological performance assessment in a PEI is required in the following cases:

- at the stage of preparing programs for the PEI development and local target programs;

- when summing up the results for certain periods of the PEI operation;

- for making managerial decisions on personnel matters;

- for solving problems associated with the enhancement of a career development system for personnel;

- during certification of teachers.

Carrying out the procedure for assessing methodological performance in a PEI will ensure support for the organization's processes, as well as facilitate a transfer of the organization from a merely functioning state to the state of dynamic development.

It is appropriate to consider methodological performance evaluation as an integral part of the system of assessing the performance of a preschool educational institution and as the most important foundation for solving the problems of preschool education quality management in a preschool educational establishment.



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## Conflict of interests

The authors declare no conflict of interest.

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# PROBLEM-SOLVING ABILITY OF STUDENTS WITH DISCIPLINARY LITERACY INSTRUCTION

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## ABSTRACT

The literacy movement has not been widely applied to the learning. This study aims to determine the effect of the application of disciplinary literacy instruction to cognitive learning outcomes, especially in problem-solving ability. The population of this study is all senior high school in Sleman, Indonesia and have implemented the literacy movement in habituation and development. Two classes in SMAN 2 Sleman becomes sample with experimental and comparative classes. Both classes performed daily tests on two consecutive materials to see the abilities in the two classes. The results were analyzed using SPSS program and showed normal and homogeneous results and significance values were above of 0.05 were 0.968 and 0.483 respectively. This indicates that there is no difference in the cognitive learning outcomes of the two classes. The research instruments consist of the syllabus, learning implementation plan, article, student worksheet, and questions. Validation used in the form of content validation to two experts and empirical validation to 150 students. The analytical technique used to analyze the influence of the application of disciplinary literacy instruction on problem-solving ability is ANOVA test at significance level 0.05. The results showed that both classes had normal and homogenous learning outcomes and significance value of 0.009, the value is below the level of significance 0.05. This number indicates that there is the influence of application of disciplinary literacy instruction on problem-solving ability in the electrolyte and non-electrolyte solutions material.

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## 1. INTRODUCTION

The implementation of school literacy movement at the high school level is conducted through three stages: (1) the stage of habituation, (2) the stage of development, and (3) the learning phase. Habituation phase can be implemented with growing interest in reading through 15 minutes of reading. The development phase is the next stage in order to improve the literacy skills through enrichment activities respond to the book. Phase habituation and development is the foundation to the last stage, the stage of learning. In this

phase, the strategies used in teaching literacy in all subjects ([General Directorate of Primary and Secondary Education, 2016: 8](#)). In fact, literacy movements in some schools still at the stage of habituation and development. Systematic and continuous efforts need to be done to improve the literacy skills of students. School literacy movement to foster interest in reading and proficiency literacy has been implemented in Indonesia since 2016, but there is currently too touching aspects of learning in the classroom.

Chemistry as a product in the form of facts, concepts, principles, laws, and theories while the chemical as a form of scientific work processes and chemicals as attitude. Chemistry as a process and attitude can train problem-solving ability. Their scientific literacy in students will make students able to master science, with life skills and abilities in the face of scientific problems that arise in life. Problem-solving ability must also be owned by every student. Problem-solving ability skills can be trained in teaching chemistry, which is shown

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by the understanding the problem in reading and prepares according to the rules of scientific writing. In an article from Pelger and Nilsson said that the influence of the scientific literature students enormously in understanding the material (Pelger and Nilsson, 2016: 441). The learning process should train chemistry literacy with troubleshooting and write appropriate scientific principles. In fact, the learning process is still focused on the chemical aspects of the results. The learning process chemicals tend to encourage students to be able to work on the final exam only, while aspects of the process and a lack of attention. Conventional learning process which is still dominated by the lecture from the teacher.

Risnawati stated that the ability is the proficiency to perform a particular task within a predetermined condition (Risnawati, 2008: 24). In the learning process of acquisition is the purpose of learning ability. The ability is the capability that has been described specifically and stated in terms of behavior. According to Kennedy et.al (2007: 115), A problem is a situation that has no immediate solution or known solution strategy. Troubleshooting is a strategic competence shown students in understanding, selecting the model and coping strategies, and complete the model to solve the problem (BSNP, 2006: 59).

The points where they commonly get stuck while solving problem is dead ends that could result from (a) following a mis-conception or an alternative conception; (b) making inappropriate assumptions; (c) ignoring dimensional aspects of a problem; and (d) reporting an incorrect answer (Yuriev et al., 2017: 7). In talking through the problems, students take on regulative and instructional tasks, articulate problem-solving skills, ask and answer questions, and reflect on their learning. The student regulative communication helps the groups move through the problems by managing the group learning process, promoting discussion, restating or summarizing ideas, and confirming or questioning one another's contributions. The instructional communication show evidence of students actively practicing science language as they communicate with one another to move through and build content knowledge (Repice et al., 2016: 16).

According to Polya (1985), the problem of the problem contains 4 steps of completion, (a) to understand the problem that students can understand the problem so that students can determine the solution, (b) make the student's plan. (c) do the calculation of the students are ready to do the calculations in accordance

with the plans that have been made, and (d) to re-check the results of students re-check every stage that has been done.

Problem-solving is one type of intellectual skill that is according to Gagne et al. (1992) is higher level and more complex than type other intellectual skills. Gagne et al. (1992) have argued that within solving the problem is required for complex rules or rules high level and high-level rules can be achieved by mastering the rules and defined concepts. Likewise, defined rules and concepts can be mastered if supported by understanding concrete concepts. After that to understand concrete concepts needed skills in differentiating. The intellectual skills are classified as Gagne based on levels its complexity and composed of the simplest mental operations up at the most complex level.

According to Jacobsen et.al (2009: 250) solving the problem has two goals: the short-term goal is that the students were able to solve the problem and be able to understand the content is behind the problem. Besides the long-term goal is to make students understand the process of problem-solving and develop as Self-directed learning (students organize and control their own learning). When getting with the task of solving the problem in the absence of prior knowledge of relevant, so that students need to seek out parts that might be a solution to use problem-solving strategies (as opposed to a strategy based on a strong knowledge, domain) as a meaningful analysis or technique of trial and error, such activities can lead to a high cognitive load. One of the consequences of approaching the complex learning is the need to abandon the rigid dichotomy explicit teaching of learning that supports a flexible approach that takes into account the specific objectives of the various activities of students constituent (Likourezos and Kalyuga, 2017).

Bell (1978) has stated the results of the research indicate that strategy problem solving commonly studied in lessons, in some cases, can be transferred and applied within other problem-solving situations. Therefore the ability of student in solving a problem must continue to be sharpened. Because by solving problems students will find new concepts in learning.

Attempts to improve the learning process through the efforts of the selection of appropriate learning strategies and innovative in teaching chemistry in schools is a very important requirement to do. During this time teachers still tend to use expository teaching strategy, where most of the teaching and learn-



ing activities are still dominated by teachers who actively teach chemistry, and provides examples and exercises, on the other hand, the students just listen, take notes, and work on the problems provided by the teacher. These conditions are not going to develop aspects of personality, ability, and the student activity as expected. Because it requires a learning strategy that involves students who proceed to troubleshoot so that students will understand, appreciate, and take lessons from his experience. The purpose of this study is to determine whether or not the implementation effect of learning strategy with disciplinary literacy instruction to the ability to solve problems on the material of electrolyte and non-electrolyte solution in the tenth grade of senior high school.

## 2. MATERIALS AND METHODS

This study uses a quasi-experimental with posttest only group design. In an experimental and comparative class applied learning strategies, the experimental class using strategy with disciplinary literacy instruction and another class applied comparative study by using the usual expository strategy in the classroom.

**Table 1.** Research Design

No	Class	Treatment	Posttest
1	A	X	O
2	B	Y	O

Description:  
A: Experimental Class  
B: Comparative Class  
X: Learning strategy with disciplinary literacy instructions  
Y: Learning strategy with expository  
O: Test of problem-solving ability

The population of the study is the state senior high schools located in the districts of Sleman and have implemented literacy at the stage of habituation and development. Some state senior high school were interviewed and observed about the implementation of literacy in learning and the results of which have the same characteristics that have not been fully implemented literacy in a learning phase. The sample used in the study of a randomly selected school that was selected SMAN 2 Sleman as a research site. Two classes are used for the purposes of this study are XMIA 1 as the experimental class and XMIA 2 as the comparative class.

The independent variable in this study is a learning strategy with disciplinary literacy instruction while the control variable is the problem-solving ability of the material of electrolyte and nonelectrolyte solution. Data collected by the data nontest and test. Mechanical nontest data collection is done by observation and interview. The observations were made with the observation sheet to observe the learning process in accordance with the lesson plan using strategies disciplinary literacy instruction for experimental class and expository strategy for comparative class.

Disciplinary literacy instruction represents a paradigm shift in content area literacy pedagogy, requiring LTEs to re-envision and redesign their course in ways that support students' acquisition of disciplinary content and habits of mind (Fang, 2014: 447). Along with the challenges of disciplinary literacy, there are also possibilities, which can be exciting for teachers. The instructional procedures that have proven successful in students' literacy development are based on engagement with the text, and the practices and strategies for disciplinary literacy build on this work (Fana, 2015). Professional development is critical if disciplinary literacy practices are going to deepen what it means to read in each academic subject area. The focus of disciplinary literacy is how literacy is used to make meaning within and discipline and the role of graphics is specific to the discipline (Shanahan, 2015: 15). Given the modifications we made, is a reasonable and potentially useful one for promoting disciplinary literacy in social studies among middle-school students and among pre-service social studies teachers (Colwell, 2013:12).

Tests are a number of questions that must be addressed with the aim of measuring the level of a person's ability or reveal certain aspects of a person subjected to the tests. In this study, tests were conducted to measure the ability to solve problems by using the description matter. Set about the description made as many as 15 items, grating matter and guidelines for assessment and validation process is carried out. The validity of research instruments carried into two parts, namely the validity of the theoretical and empirical validity. The validity of theoretically calculated with the Aiken formula (Aiken, 1985). In addition to the validity, data collection instruments should also be ensured that the measurement results remain consistent (reliable). In this study the reliability test using Quest program. Test of the hypothesis analysis was used ANO-

VA with SPSS 22. Before analyzing the data, the data is tested for normality and homogeneity of variance. Anova is done by looking at the hypothesis criteria are:

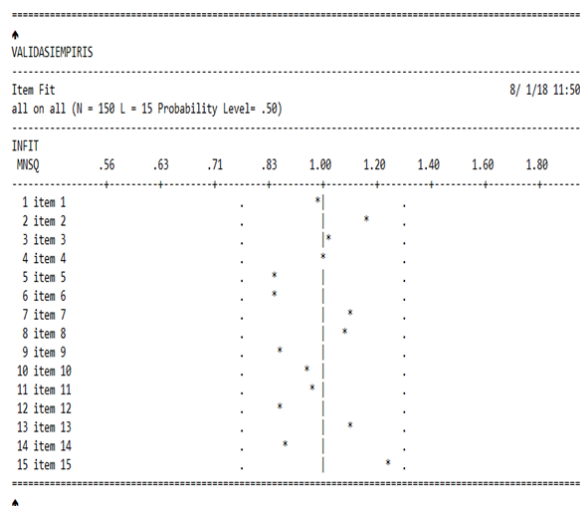
Ho: No effect of the application of learning strategy with disciplinary literacy instruction to the ability to solve problems on the material of electrolyte and non-electrolyte solution in the tenth grade of senior high school.

Ha: There is an effect of the application of learning strategy with disciplinary literacy instruction to the ability to solve problems on the material of electrolyte and non-electrolyte solution in the tenth grade of senior high school.

### 3. RESULTS

The study began by conducting interviews with several senior high schools in Sleman country and interview show that the literacy learning is still rarely performed. Then the technique of sampling with random sampling and set SMAN 2 Sleman as a research site. At the school were taken two classes, one class as the experimental class and the other class designated as the comparative class.

Learning to use disciplinary literacy instruction aided by using articles that have been made and validated it. Some of the articles used in this study on the implementation of the material an electrolyte and non-electrolyte solutions in life. A set of instruments such as the questionnaire, syllabus, lesson plan and observation sheet of lesson plans, articles and worksheets for students and validated descriptions about the contents on two experts and conducted empirical validation and reliability seen at 150 students. The student who is the subject of the implementation of the validation is the eleventh-grade students who already have material electrolyte and non-electrolyte solutions. The results of the validation and reliability are then processed with the help of the program Quest and obtained the results as shown in Figure 1:



**Figure 1.** Results Quest analysis of empirical validation

Based on Figure 1 shows that all the stars items about shows in the brackets, then by using the calculation of the Aiken formula, the instrument of this matter is valid. Reliability is analyzed by using Quest program and produce reliable data with value Cronbach's alpha 0.73. However, the implementation of data collection is only 10 questions were needed and used to test students. Two classes used in this study extend the initial assumption of equality of cognitive abilities through daily tests in the previous chapter. The analysis was performed using one way ANOVA analysis with the SPSS.22 program. Before the ANOVA test analysis, the data were tested for normality and homogeneity and show normal and homogeneous data. Results of ANOVA analysis on the first previous chapter can be seen in Table 2:

**Table 2.** One-way ANOVA test result of first material

	Sum of Squares	df	Mean Square	F	Sig
Between groups	.063	1	.063	.002	.968
Within Groups	2356.375	62	38.006		
Total	2356.438	63			

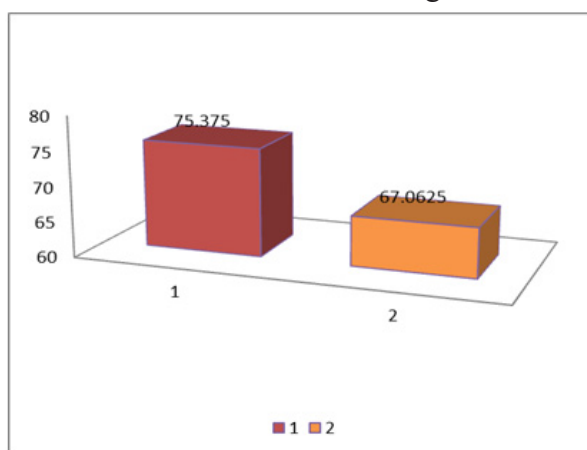
Table 2 shows the value of significance is greater than 0.05, namely 0.968. Then to get more accurate data that both classes have the same ability then analyzed in the second test of the previous chapter. As the first daily test analysis, the data were tested for normality

and homogeneity using SPSS 22 and then proceed ANOVA analysis of one way. Results of ANOVA analysis on second previous chapter can be seen in Table 3:

**Table 3.** One-way ANOVA test result of second material

	Sum of Squares	df	Mean Square	F	Sig
Between groups	20.816	1	20.816	.498	.483
Within Groups	2590.930	62	41.789		
Total	2611.746	63			

Table 3 shows the value of significance is greater than 0.05, namely 0.483. Both daily tests performed showed significance above 0.05 which indicates that both classes have the same ability in cognitive learning outcomes. Then the research was done by providing the treatment in the experimental class. The study was conducted during the four meetings with the four stages of learning and one posttest data retrieval. Each meeting in the learning phase students read the article, understand and discuss together in the classroom, guided by the subject teachers. Then at the fourth meeting of the two classes doing the practice by observing various electrolyte and non-electrolyte solutions, it was assisted by students worksheet to train students ability to solve problems. After the posttest and the got the average value of the two classes as shown in Figure 2:



**Figure 2.** Average value of the two classes

Description:

- 1: Average of experimental class
- 2: Average of comparative class

The diagrams show significant differences in students' cognitive ability outcomes, especially problem-solving skills in the experimental and comparative classes. Not only see the average value but also see significant value through ANOVA analysis. The results of the data problem-solving ability of students showed homogeneous and normal data as shown in Table 4:

**Table 4.** Results of the test of normality test problem-solving ability  
One-Sample Kolmogorov-Smirnov Test

	Test	Class
N	64	64
Normal	Mean	71.22
Parameters <sup>a, b</sup>	Std.Deviation	12.899
Most Extreme Differences	Absolute	.113
	Positive	.113
	Negative	-.080
Test Statistic		.113
Asymp. Sig. (2-tailed)		.041 <sup>c</sup>

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Significance Lilliefors Correction.

**Table 5.** Results of homogeneity test problem-solving ability

Levene Statistic	DF1	DF2	Sig.
1275	1	62	.263

On the Table 4&5 indicate that the data is normal and homogeneous, so the data analysis can be continued by using one way ANOVA analysis to see the effect of the treatment given. The results of data analysis can be seen in Table 6:

**Table 6.** One-way ANOVA test result of the problem-solving ability

	Sum of Squares	df	Mean Square	F	Sig
Between groups	1105.563	1	1105.563	7.310	.009
Within Groups	9377.375	62	38.006		
Total	10482.938	63			

## 4. DISCUSSIONS

In the 21st century, people are required to master literacy such as reading and writing literacy, science literacy, information and communication technology literacy, financial literacy, and cultural and civic literacy. Literacy has become a familiar term for many, but not many of them understand it well. Literacy can be fundamentally defined as a person's ability to process and understand information while doing the process of reading and writing. Literacy requires a range of cognitive abilities, written and spoken language knowledge, knowledge of genres and cultures. School as a portrait of the miniature society that can form the character of the student as a literate individual. Therefore, the school can be a place to cultivate good literacy at the stage of habituation, development, and learning, and until now the literacy at the stage of splinting has not been widely applied. Disciplinary literacy is learning strategy by finding concepts, principles of learning and training students to compile and transform information.

In the study, two consecutive chapters show data from two classes are normal and homogeneous, then seen the differences, and show no difference in terms of cognitive ability. It became the material and reference for continuing research on the influence strategy of disciplinary literacy instruction.

In the experimental study, the experimental class is given treatment by disciplining the literacy on the learning while in the comparative class is applied expository learning strategy where expository learning is a traditional learning that has been passed down in the class. Expository learning is centered on the teacher so that the teacher as the main informant. The implementation of learning strategy of disciplinary literacy instruction is expected to influence the ability to solve the problems of the students.

In this study will see the effect of strategy on the condition of students' cognitive abilities the same to the problem-solving ability. All types of literacy, literacy is preferred in this study. The teacher has prepared several articles as a supporting material for every learning that takes place. This disciplinary instruction has several advantages to discipline literacy especially in terms of literacy reading such as helping students understand the concept.

The first lesson in the experimental class begins with giving an article about the battery and its relation to the electrolyte and non-

electrolyte solutions material. The discussion of this literacy understands and discusses how electrolyte solutions are placed in containers or battery vessels made of ebonite or glass materials. Both plates are made of lead (Pb), and when first loaded there will be a layer of lead dioxide (PbO<sub>2</sub>) on the positive plate. Positive and negative plates are very close together but are made to not touch each other in the presence of a separator layer that serves as an insulator (insulating material). Chemical processes that occur in the battery can be divided into two important parts, namely during use and re-loaded or electrocuted. In this case, the educator tries to facilitate the student to discuss both processes.

At the second meeting, the teacher gave an article about isotonic in the body which is certainly related to the material of electrolyte and non-electrolyte solution. For example, isotonic drinks are used as a substitute for lost body fluids because they have a similar composition to body fluids such as electrolytes and the composition is designed with the same osmotic pressure as the blood pressure in the body.

At the next meeting, the article contains about a drug called oralit in it also contains electrolyte salt. The body must be able to maintain the concentration of all the appropriate electrolytes in the body fluids, it makes easy to achieve fluid and electrolyte balance. The article also contains a description of how oralit can balance electrolyte fluid levels in the body in conditions such as excessive sweating, vomiting, or diarrheal disease. In each article students are required to understand the reading holistically and search for important sentences about the concept of matter. In addition, students are brought on real-life related to chemistry.

At the last meeting, the two classes were given a problem that had to be solved by the practice process and then followed by a meeting that tested the problem-solving ability with the description problems and saw at how is the difference of two classes. Both test results not only show different mean values but when tested using ANOVA program shows the significance value of 0.009, the value is below the level of significance 0.05, which indicates that there is a significant effect of the implementation of learning strategy with disciplinary literacy instruction on problem-solving ability in the electrolyte and non-electrolyte solutions material. If a student has been practicing solve the problem, then in real life, the student will be able to take a decision on an



issue, because they have the skills to collect relevant information, analyze information, and realize how necessary to re-examine the results already obtained. The problem-solving ability can be seen as one of the process and result of instructions.

## 5. CONCLUSIONS

This research concludes that the implementation of learning strategy with disciplinary literacy instruction influence the students' ability to solve problems in the material of electrolyte and non-electrolyte solutions material in tenth grade at senior high school.

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### Conflict of interests

The authors declare no conflict of interest.

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# APPLICATION OF COMPUTERS IN MODERNIZATION OF TEACHING SCIENCE

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## ABSTRACT

The basic tendency of this paper is to point to the increasing application of information technology in teaching, and therefore also in the teaching of science and society. This means that educational process is constantly developing and improving, but teaching aids also are modernizing. Modern didactic and methodical knowledge are increasingly pointing out the shortcomings of traditional teaching and they offer solutions for overcoming these drawbacks, among the others, and through the modern informational technologies. In this sense, the use of computers is not just something that is recommended but it is becoming more necessary since it is the path to the active acquisition of knowledge and creativity. Multimedia teaching resources, contents and educational computer software enable students to critically use knowledge sources, to independently learn, analyze, systematize, compare and explore. The advantages offered by informational technologies are also in the fact that the teacher is relieved from one part of the obligation, teaching type, so it leaves him more time for the design of the teaching process. Purposefully use of teaching aids and forms of work, takes into account the capabilities of each student. The use of the computers and educational software in teaching provides a better flow of information since the presentation of information is performed through the multiple senses, so students can receive them visually or acoustically. Temporarily use of modern teaching aids (computers, educational software, etc.) allows students to come up quickly with different information and thus fulfill not only their increased interest in a particular area but also gain new knowledge.

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## 1. INTRODUCTION

In a society where informational technology affects all social segments and where the learning, work, and entertainment take place under a new, virtual environment are being created conditions for the emergence of the so-called informatic society that has the potential to grow into a knowledge society. This means that at the same time was developing and promoting the teaching process, but

also was modernizing teaching resources as well as technical equipment and tools used by the teacher and student.

We are witnessing a sudden and rapid development of science and technology, and in the field of education and teaching are also visible consequences of the scientific and technological revolution that brings new opportunities. While in traditional education students are generally passive, teachers are guardians of knowledge, "the use of computers opens new opportunities for active learning in which the student as a researcher takes responsibility for his own learning. But the teacher still remains the creative holder of teaching, and the use of new technologies gives him new opportunities to encourage creative expression in children. Also, it is important to emphasize the positive impact on motivation for work and learning that new technologies can have, and as confirmed by many studies (Robertson and

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Good, 2005: 45, 58).

Innovations in program contents of subjects in schools will not lead to substantial changes if they do not provide a new strategy of teaching, enriched by a variety of forms, contemporary learning models, dynamic working methods, as well as the application of modern educational technology. The use of modern teaching aids enables that with their application, teaching material represents to students in an obvious, dynamic and interesting way, taking into account the age and capabilities of students.

In order to achieve the best results in the process of transfer and acquisition of knowledge, development of abilities and interests of students and thus improve the quality of the educational process, it is essential that teachers use the possibilities and advantages of modern teaching aids, computers, and other devices, as well as educational software on the most appropriate the way. New technologies have made from the computer a device without which one cannot imagine a more serious business, as well as the people's daily lives. Life by the computer and with the computer, in fact, is becoming quotidian.

Nowadays, students are exposed to a variety of multimedia content that is on every step. They are overwhelmed by the many different types of information, and their attention is focused on a variety of content. In such an environment it is necessary to improve and innovate the teaching so it can become more acceptable, interesting and useful to the students.

All this shows that under the pressure of computerization, school is losing more and more privilege to be the largest source of knowledge and new information, so at this time we must be aware of this fact. For these reasons, we have to make the school modern as soon as possible, using the currently applicable forms, methods, and modern teaching aids, so teaching would become more efficient, more creative and more rational.

## **2. TEACHING OF NATURE AND SOCIETY**

The main purpose of studying an integrated subject Nature and Society is beside to gaining knowledge and skills children develop their cognitive, physical, social and creative skills, and at the same time they are learning and building attitudes and values of the environment in which they grow up, as well as the wider community. By introducing the natural

and social phenomena and legality children develop cognitive abilities, form the basic concepts and gradually build up a basis for the system concepts in the field of nature, societies, and cultures.

The best results are achieved if the children independently explore and come to experiential learning, get to know the world around them as a natural and social environment. Summarizing, supplementing and restructuring experiential knowledge of students and bringing them into contact with scientific knowledge, children's knowledge is being upgraded, checked and applied.

The overall objective of an integrated school subject Nature and Society is introducing themselves, their natural and social environment and develop skills for responsible life in it. This course represents a programming continuity of the integrated subject World Around Us in the first two grades of primary education.

The concept of the program clearly indicates the continuity in the increased development of knowledge in the natural sciences which is reflected in the selection of the program content in third grade. It also clearly highlights a new approach in the study of the past in this age which is exempt from the content of broader history, because the students acquire it harder.

In the subject, Nature and Society goals are given in two ways. Explicit objectives are clearly stated in the program content. Implicitly goals are "hidden" and they emphasize the educational component of education. Concretized through specific operational tasks and activities, and they are realized through a selection of content from the field of nature, societies, and culture.

What is noticeable is that the program of Nature and Society is relieved of factography and repetition. The changed concept of the program avoids repetition and allows upgrading knowledge, skills, skills, and attitudes. The conception of the subject includes training students to use different sources of knowledge, graphic and electronic media.

The program only determined the general objectives and tasks of Nature and Society as a whole, and further operational elaboration of goals and tasks was left to teachers as a kind of freedom in creating the teaching process.

The realization of the objectives and tasks through the offered content of the program Nature and Society are the common obligation for all participants in the educational process. Set goals and objectives are realizing,



primarily, through the educational process in the school, enriched with the other forms of activities within the school curriculum. For the purposes of this subject are particularly suitable: organized visits, walks, tours, classes in nature, designed excursions, wintering and summer vacations for the students and all other forms of ambient learning. Besides using officially approved textbook sets, in the program realization of the subject Nature and society it is recommended wider use of literature and other information sources: printed, audio-visual and electronic media; especially authentic natural and human resources, as credible indicators of reality, phenomena and processes in the world in which we live.

In the teaching of Nature and Society are applied all types of teaching materials: natural teaching aids, models, maps, photos, and applications. However, in the selection of aids, the teacher should opt for those assets that will optimally respond to the content and tasks of teaching units, as well as to abilities of students.

The subject of nature and society is, in fact, the result of the didactic and methodical transformation of the content that comes from living and inanimate nature, from history, geography, production, sociology, ecology, techniques, technology, traffic, general culture, work culture, education, arts and everyday human life. Students are not acquainted with the undesigned contents, which is requiring both didactic and methodical transformation of the content of natural and social sciences.

Professional activities teaching about nature and society should serve primarily as the basis and resource of pedagogical work for the realization of pedagogical tasks, forming of the basic concepts of nature and society, developing of interests, curiosity, and capacity for understanding natural and social phenomena at the age of the students. Knowing the skills development of the students at this age is one of the requirements for the design of educational content about nature and society (Stanimirović and Andjelković, 2003; 45).

The criteria for selection of the content from the natural and social sciences, techniques and technology, art and everyday human life may be found in the philosophical, scientific and pedagogical discourse. Philosophy criteria contribute to more neatly and objective consideration of the content of teaching and its spiritual-scientific concepts. Respecting of scientific criteria in the choice of teaching content ensures coherence, confidentiality, and accuracy of knowledge about nature, man,

and society. Appreciation of the pedagogical criteria allows for the curriculum to be devoid of superfluous positivist designed and unsuitable student teaching content (Ibid.).

Compatibility of the contents of teaching about nature and society with the aim of education is viewed and evaluated based on the selected content with the aim of education in general, with the goal of primary education and the goals and tasks of teaching about nature and society. Compatibility of the subject contents of Nature and Society with age, especially psychophysical and educational capabilities of students - respecting of this requirement in the selection and methodical processing of the contents of teaching Nature and Society, provides the appropriateness of the content in terms of size, depth, and the sequence of the psychophysical and educational characteristics of the pupils.

The spatial and temporal closeness of the contents to the pupil or the principle of the proximity environment binds also the builder of the teaching content in Nature and Society and their implementers (teachers), to choose those elements that are spatially and temporally close to the living conditions of the students. Representativeness and timeliness of the teaching content allow the compiler of the program, and later to the teacher, to independently regulate the scope and depth of the teaching content about nature and society and thus to make their content appropriate to the students' age abilities.

Content that teacher introduces in teaching, and content that belong to the knowledge of the proper science or other systems of human knowledge, should be such that: they represent basis for the development of organized conceptual and other relevant knowledge, not isolated and primarily factual situation; to represent a good basis for the expansion of the existing knowledge and the continuous development of the new knowledge; to be in order to prepare children to apply, in new situations, what they have already learned (Ibid., 49).

The role of the teacher is not only in terms of assistance that he provides to the students but also in terms of planning, organization and creating conditions for performing teaching activity, as well as providing the necessary aid when it is required. Therefore, he has the important task, in teaching the subject Nature and Society, to make it clear from the beginning that all the ideas and performances are subject for verification and not only those that students have, but also those which explains the teacher or textbook. A

teacher's primary role is that through various activities continuously improve and develop the student's knowledge of specific problems, whereby he has a dominant role in the creation of a social climate in the classroom. This is achieved the best with the help of the obvious means at the time, as well as with the application of information technology.

### **3. ROLE OF MODERN EDUCATIONAL RESOURCES IN TEACHING SCIENCE AND SOCIETY**

In the didactic literature, as well as in school practice, there are different opinions regarding the general name for devices used to serve teachers and students in the teaching process. According to the contemporary understanding of cognitive processes, teaching resources are the material basis for the cognitive activity of the students, and therefore they are used in all stages of the educational process. One of the most general formulations of the actuating means is: a teaching means are didactic-methodical designed objective reality (Poljak, 1984, 55).

Teaching aids eliminate the disadvantages of the primary sources of knowledge. Broadly, teaching aids are all subjects that are used in teaching, taking into account the most important pedagogical, psychological and methodological principles. Teaching resources are sources of knowledge. Teaching aids are the part of the material bases of the labor by which the goals and tasks of teaching are achieving (Filipović, 1977, 124).

One of the most acceptable classifications of the teaching resources is the division of the verbal, visual, auditory, audio-visual and textual teaching tools. Teaching aids are tools for the application of the actuating means. These include: overhead projector, slide projector, applicator, magnetic board, radio, tape deck, TV, VCR, computer, projector-beam. In recent years, in the didactics is applied the term didactic media (Vilotijević, 2007, 424).

Modern teaching aids facilitate the efforts of students and teachers and allow a tighter connection between theory and practice, culture and civilization, knowledge and skills of the individuals, generations and society as a whole. Teaching aids are brought revolutionary changes not only in the didactic thought but also teaching practice of all institutions of general education and professional

character.

The basic functions of teaching aids are achieving of the obviousness, encouraging the intensification of the teaching and the development of intellectual and other capabilities, to achieve rationalization and cost-effectiveness of the teaching and they represent a material support to thoughtful students' activities.

The importance of teaching aids in the educational process is very large. Based on how much they are using teaching resources depends on the working atmosphere at the class, attention, and activity of the students, emotional relationship with the teacher and the subject. Using teaching aids are being developed visual, auditory and other sensory abilities, thinking and emotional, physical and moral dimensions of personality (Filipović, 1977, 124).

The items that are used in teaching may be found in nature or has been produced, and represent the last word of the technique. With the help of modern teaching aids such as educational software, the electronic laboratory for multimedia teaching can significantly enrich teaching. At the same time, opportunities are provided for teachers and students to get rid of many routine tasks, to express greater degree of creativity and that education receives the characteristics of constructivist attitude towards learning, which is the tendency of modern teaching systems (Abdulwahed, Nagy and Blanchard, 2008; Robertson & Good, 2005). By using appropriate teaching aid it will be easier for teacher to adapt teaching to the prior knowledge, interests, and abilities of the students. This aids significantly contribute to the faster modernization of the forms, methods, and procedures in the classroom, so students will learn more by seeing, exploring and solving problems.

"The introduction and use of the media in education meet at least two expectations: First, education is becoming more accessible, the physical barriers of the distance of space and time are overcome, and secondly, the media allow the improvement of the quality of education in didactic terms" (Blažič, 2007, 21). This means that the use of educational software, the electronic laboratory for multimedia teaching and other informational resources ensure a better way of learning, permanent memory and safe identification of what is remembered. The advantages of using modern teaching aids are such as easier preparing and performing teaching, independent work of the students and application of acquired knowledge in practice.

Modern teaching aids stimulate the cognitive activity of the students in the process of acquiring knowledge and developing an interest in self-employment. Technical devices quickly put in using the teaching tool which contributes to the greater economy of the class. Modern educational technology with using multimedia system create a precondition for engaging all the senses in the process of acquiring new knowledge, develop students' creativity and ensures their greater class and learning participation. Students can connect new knowledge with existing and to concentrate on the context and concepts rather than on facts (Abdulwahed, Nagy and Blanchard, 2008, 1).

All this shows that the new media and informational technology enrich the sources of the knowledge and that the teacher is no longer the only source of knowledge. First of all, we are thinking of the cable television, the computer, and the Internet. The main problem in using these media (particularly in younger age students) are doubts whether these sources are relevant and whether they are adjusted to the level of knowledge and maturity of the students. Therefore, the role of the teacher is very important and they need to prepare for the implementation of innovations in education in order to get the most from their use and thus move from traditional to modern school (Stošić and Stošić, 2013, 13).

Teaching aids that should activate the pupils and encourage them for independent, originaive and creative attitude towards what they adopt, request of the teacher far greater activity and involvement in the preparatory stage and a different approach to the whole organization of the teaching. This is why teachers underused teaching resources and multimedia content, despite the fact that the knowledge of the students is gained without them are largely formalistic, so in teaching dominating receptive acquiring of the knowledge, cultivate the memory, neglect of thought processes and self-acquisition of the knowledge (Budić, 2006, 181). This problem can be partially solved by using the hypertext or the hypermedia because they can be controlled in terms of the resources, and students are free to use them if desired. It encourages students to appreciate the study of the literature as an additional source because it serves them, and they were not imposed on them, and on the other hand, allows and encourages the intellectual development of the children (Dillon and Gabbard, 1998, 322).

The use of computers and software with

multimedia content effectively suppresses formalism and verbosity from the teaching. Their use increases the activity and encourages students, fosters independence in the work, developing a sense of comprehensive review and analysis of the problem, sharpens the ability to observe, apply a variety of the practical activities, upsets the traditional relationship student - teacher and build a completely new partnership relationship between them. With the mentioned multimedia content can be achieved fully understanding of the content in some subjects and open the way for learning through the projects, and radically transform the work in the school and classroom (Abdulwahed, Nagy and Blanchard, 2008; Vilotijević, 1999; Dillon and Gabbard, 1998).

In this sense, electronic learning (e-learning) is now the key term that refers to the process of modernization of education under which the definition of the American Association ASTD (American Society for Trainers and Development) in 2001 means the methodology by which teaching content or activities learning are delivered by electronic technology. This definition embraces all diversifying names and specific forms of e-learning: E-learning, Web-Based Learning, Web-Based Instruction, Internet-Based Training, Distribute Learning, Advanced Distributed Learning, Distance Learning, Online Learning, Mobile Learning, Remote Learning (Glušac 2012, 5).

The essence of this doctrine is that it is easier and increased by using the ICT technologies and it is considered as flexible learning which includes a numerous strategies and technologies that support the learning process or the acquisition of knowledge and skills not only for students in the formal education process but also for all the users in the process of lifelong learning. When it comes to e-learning in the process of institutional educational interactive communication, it does not exclude existing methods of work in teaching, but complements them and enrich (make achieving of educational goals easy by meeting individual needs of students).

Considering that by using educational software, students progress according to their own abilities, they master the curriculum content at their own pace, they can return to a vague content and receive additional information, and at any time have the feedback on their achievements, it is incomprehensible why they do not sufficiently use in practice.

Multimedia content simultaneously engages multiple senses of student and thus contribute to a complete experience and un-



derstanding of the processes and phenomena. Through multimedia systems, it can provide simultaneous presentation of the text, video images (fixed or mobile), audio (speech and music), graphics and efficient search, process and store the valuable information (Mijanović, 2004, 253).

Of all the subjects in the elementary grades, the most appropriate content for the application of multimedia content has the object World around us / Nature and Society. Teaching this subject, based on interesting, authentic and interdisciplinary content, allows active, independent and creative participation of the students in all stages of the learning process. Similar conclusions brought and Jones (Jones, 2003) in a study conducted in Australia in the similar facilities.

To encourage greater class participation is necessary involvement of most students' senses, which can be achieved only with the new informational technologies that allow the student to simultaneously observe, listen, think and perform certain actions by moving a cursor on the screen. Multimedia features represent the integration of the images, text, audio, and movie into a single computer system and, if used in combination with the innovative teaching models, they can contribute to the improvement of teaching Nature and Society.

The advantage of information technology and educational computer software is that the students are given the ability to perceive and understand the phenomena and processes which are happening in nature slowly or too quickly, and those tiny the one that the naked eye can not perceive, or so large and away that man's senses are not able to register them. Multimedia movies and animations, if necessary, can be speed up, slow down, magnify, reduce or repeat as many times as necessary. Multimedia contents of educational software occupy students' attention and because they can interest students for the problem, bring it closer to life and didactic format it, so that the student arrives at the desired knowledge and critical approaches him, but also provide important feedback on student's understanding and progress (Abdulwahed, Nagy and Blanchard, 2008, 3-5).

## **4. APPLICATION OF COMPUTERS IN TEACHING SCIENCE AND SOCIETY**

### **4.1. Computer software models in function of modern teaching**

Today in the field of education in elementary school, when we are talking about to modern teaching, different models of software are used under the name educational computer software. This software include programming languages and the specific organization of teaching and learning based on logic and pedagogy. Considering the great potential of computers and digital technology, the conditions for the unlimited development of computer modeling and simulation are created. Application of software model in teaching has an aim, not only making the technical literacy of students but also contact with computer technologies and possibilities of their use. In this sense, educational computer software in teaching in general, including the teaching of Nature and Society, teaching content represent to the students at the obvious, dynamic and interesting way, taking into account the age and abilities of the students.

Educational computer software (ECS) is the intellectual technology and include ready-made computer programs that can be used within the content of the teaching, and who help and guide the individual learning phase. With the question of creating software and multimedia didactic teaching strategies a great number of domestic authors were dealing (Mandić, 2003; Matijević and Topolovčan, 2017; Nadrljanski and Nadrljanski, 2008; Radosav, 2005), giving a significant, primarily, theoretical scientific basis. However, until today there is still a great deficiency in the offer of any practical and of methodical solutions of the mentioned problems (Stanojević et al., 2017, 186).

Considering a large number of versions, the problem of classification of the educational software (ECS) is a very complex task, because it requires a certain standardization. Every year, the number of new solutions increasing, so it is understandable why none classification can not take the final, and that a large number of scientists pay attention to the classification of software for the various reasons, there are also the different classifications. For the classification basis is usually taken as a criterion learning method, the tool in the educational process, independence of the management, uses of computers and classifi-



cation by the subjects. In most classifications, there are stated the same models or types of software, but it is depending on the criteria of classifying and ranking explained their specialty. There are many criteria for the classification of multimedia educational computer software, which indicates that this area is very complex and that the educational software is very diverse. Classification of software in this paper was carried out according to the following criteria: The methodological, pedagogical and psychological, cybernetic and information and computer criteria (Nadrljanski, Soleša 2002, 104).

In the world today, many programs are developing that have been tested in controlled conditions and that showed that the possibilities they offer in the area of the independence of students in work, constructivist approach, and obtaining timely feedback can significantly improve the educational processes (Abdulwahed, Nagy and Blanchard, 2008, 8; Dillon and Gabbard, 1998, 322). With us, one such program is an educational software program Prirodnjaci (Naturalists) to the program for independent learning and it deals with the contents of Nature and Society for the third grade of the primary school. In our country, educational computer software can usually be found as an integral part of the textbook, that is, in the form of electronic books. Publisher "Kvarkmedija" from Užice has been working, for several years, to enrich the multimedia applied in schools.

Today in Serbia by issuing textbooks for primary schools many institutions are dealing, but none of them are not seriously engaged in producing educational software in general, and this applies to software in the teaching of Nature and society in the third and fourth grade of elementary school. However, Institute for textbooks and teaching aids has released discs Azbuka, I teach Latin, History and Geography, Mathematics textbook, and in addition to the World around us and Entertainment grammar, there are available and Guardians of Nature, Use your head and release AMSS Behavior in traffic. In addition to the World around us, which was conducted as a game of "Do not be madman" and is intended for the first and second class for determining the acquired knowledge about nature and society that surrounds them, no serious work. With so properly designed learning content in the form of "play" setted learning objectives are achieving more easily and more quickly and with better students' achievement, motivation is significantly higher, and teaching becomes

better and more efficient (Glušac, 2012, 30).

## **4.2. Educational software in the function of effectively teaching of nature and society**

Educational computer software with electronic sources of informations provides an overview of the documents in accordance with individual abilities, backgrounds and interests of students. It, in combination with other models of work, reduces defects of the teaching classes.

In essence, these software motivates students to acquire knowledge and encourage the need for increased speculative activity, which involves solving problems and conscious application of knowledge in new situations. Educational softer raise the level of computer literacy of children that they need in further education, providing learning through projects and encourage diversity in the work method (Jones, 2003). Jones stresses that although I cannot be a complete substitute for concrete materials, especially at an early age, educational software and materials significantly complement and enrich the children's educational experience (Jones, 2003, 5). In the development of educational software included teams of experts because it is very complex programs appropriate, first of all, the age of students, and then written in a simple and understandable language.

When the teaching of science and society is concerned, today is observed a negative phenomenon that is related to an insufficient supply of educational software that follow the curriculum of the subject. This question is important because computer education programs may be helpful to teachers and in the preparation and during the teaching process.

Given that the program content of the subject World around us / Nature and society is very complex, it is natural that it needs a different ways of introducing and preparing students for the processing of new materials, because they are complex and belong to different areas of teaching. In this regard, use of computers in teaching Nature and Society should be introduced gradually and systematically, in order to have a better effect. From content in the field of nature and society, through computers, the most successful topics could be addressed in the living nature, as teachers can enjoy a multitude of films and animations about animals and plants.

Here we will list some program con-

tents from the subject Nature and Society in the third and fourth class which are suitable for the application of multimedia programmed materials within the educational computer software.

Third grade:

- Weather conditions and their significance for the living world,
- The connection of life communities and the role of man in preserving the natural balance,
- Circulation of water in nature,
- The population of our region,
- The mutual influence of man and the environment.

Fourth grade:

- Grouping a living world on the basis of similarities and differences (division into empires),
- Flora of our country,
- Fauna of our country,
- Domestic animals and cultivated plants,
- Man is part of nature, conscious and social being.

These software contents, within educational computer software, include the use of shorter documentary film inserts, animation of individual phenomena and processes, and the use of a multitude of images that will enable better understand the content for a students.

Creating presentations and handling the program within educational computer software is relatively simple and does not require great IT knowledges, so that each teacher with elementary computer knowledge can do similar (semi-programmed) materials. Creation involves breaking up the contents of the selected teaching unit into smaller logical units grouped by weight, and formulating appropriate tasks for their exact solutions. The presentation of content within educational software can only be present in a part of the time - introductory, central or final, which depends on the content are being processed, knowledge, interests and abilities of students.

The class of teaching Nature and Society with the application of educational computer software should, for example, begin by combining the dialogical and monologic methods and demonstrating the educational activities of the educational type. The teacher asks questions that are planned by the game activities, and the students give answers which are leading up to the name of the teaching unit. After discovering what will be learned on time, the teacher gives detailed instructions to students

about how to work on educational-computer software. In order to motivate students and the announcement of the teaching unit, you can use the crosswords, associations, songs and the like. The use of associations can be even more fun if it is organized in the form of a competition, by which we encourage and develop the competitive spirit of students.

Educational software, such as Recovery, Kogot's multimedia games or multimedia quizzes, within ORS and computer-mediated teaching, can be successfully applied to achieve the goals of the introductory part of the time. These games generally include multi-choice questions and provide timely feedback on the accuracy of students' responses, which additionally contributes to motivation for work. Then, multimedia games are often suited to enrich themselves with other content, such as cartoons, educational emission inserts, or records of concepts that are studied in the context of teaching of Nature and Society.

The advantage of multimedia text in teaching of Nature and Society through the presentation of computer software is that it can be used at all stages of the time - introductory, main and final part, so that there is almost no teaching unit that cannot be illustrated and deepened with text. Here's what the sequence of moves in the work of co-educational software looks like:

At first, the student, as the first information, gets a cover page that contains keys with names of teaching units within the course of nature and society teaching, which are included in the software. By clicking on the button, electronic material opens in the form of instructions for the student's independent work. The instruction contains an explanation of what (what are the contents of the ORS), then how (the mode of work on the programmed material) and the end why (the importance of the content for further learning) the student will work. After the instructions for the work (introductory article) the unit is being processed. It consists of a certain number of "steps", i.e. the information that constitutes parts of the teaching material. The advantage of software learning is that different content is interconnected with links, which allows students to switch to content of other parts, can give them additional knowledge of what they are interested in, and then can return to the same page and continue to read the text. Linking the text allows to overcome the boundaries between teaching topics and units, to meet the need for new information or deeper explanations, and most importantly, according to some authors,

it leads to a natural form of learning that is characteristic of the human mind (Dillon and Gabbard, 1998, 323).

In the case of software Naturalistics, we give the possible sequence of activities in the process of acquiring knowledge.

At the beginning, there are questions that require recognizing knowledge. The discovery of such questions by students is that, based on the study of multimedia material, they recognize the answer that is true between the several answers offered. When a student chooses a response by clicking a word or image, he receives feedback at the same time as to whether his answer is correct or not. If the answer is not correct, the educational computer software automatically displays a slide with an additional explanation or returns the student to the same slide, again trying to solve the task set. If the answer is correct, the student moves to the next slide containing new multimedia information and questions for whose answers a higher quality of knowledge is required. In this case, questions have no answers, so students are obliged to formulate sentences themselves. Educational software also here provides feedback on the accuracy of the response.

What is specific to all educational software, and therefore ORS Naturalists, is the constant presence of feedback (Abdulwahed, Nagy and Blanchard, 2008, 8), which allows the student to know what he has learned at all times, what is not, in what has made a mistake and how to correct the error. Feedback, whether positive or negative, can be given in the form of sound effects or in the form of text. They can be like applause, cuts from cartoons, recorded voice of a teacher, or texts that appear after clicking on the answer appear over the entire screen, also in the function of positive or negative corroboration.

On the Internet, free services that facilitate the preparation and organization of the teaching material are increasingly present. Also, e-learning models that can be used in classrooms are all more accessible, which are based on properly prepared texts, photographs, films, audio recordings, presentations, electronic evaluation, educational games and quizzes, interactive software, etc. These learning resources can be recharged and supplemented, actualized and coordinated with the needs of learning. It is possible to thematically connect the contents from different sources, comparing them and thus further encouraging and fostering of exploratory- critical and synthetic-analytical potential of the students. In

this way, teachers (and students) would have access to numerous electronic learning materials and teaching (Solaković et al., 2012).

The most frequent resources used for the implementation of e-learning in classrooms are sites that are designed for the teachers to facilitate the implementation of e-learning in the traditional classroom. Some of these Web addresses are: <http://veseleklupe.wordpress.com/about>, <http://www.zbornica.com>, <http://www.zbornica.rs>, <http://www.kreativnaskola.rs>, <http://veseleklupe.wordpress.com/about>, <http://riznica.wordpress.com>, <http://klikdoznanja.edu.rs>, <http://www.deteplus.rs>, <http://naukica.wordpress.com>, <http://uciteljskoblogce.wordpress.com>, <http://www.umotvorine.net>, <http://www.razredna-nastava.net>, <http://ispeciparecideci.wordpress.com>.

Hilčenko (2013) quotes access through the use of animated films in the context of e-learning, and it is also interesting the access through the use of a blog (for a particular subject in a particular class), as well as the learning platform ([pid3.blogspot.com](http://pid3.blogspot.com)). Šikl, Novković and Spasojević (2014) did an analysis of such sites in Serbia and in the region from the aspects of the presence of the contents from the following categories: planning of teaching, realization of teaching, preparing lessons, multimedia, evaluation of students' work, creative ideas, useful links, educational games, educational texts and the ability to communicate. The conclusion is that the sites that are available to the teachers are fairly comprehensive, in addition to the contents from all segments of classes they also provide the ability to communicate and thus provide higher quality and feedback effects of the application of e-learning in the classroom.

### 4.3. Changed role of teachers and students in modern computer class

In the history of the school, for a long time, traditional teaching was held with a teachers' lecture at its center. It was at the center of the educational process and the exclusive source of knowledge it taught and determined how successful learning was.

However, the new concept of school and learning is based on new conditions and on information technologies that put students in the center of the educational process with all their specificities and possibilities. But the role of teachers in the new circumstances is of immense importance because it changes in the new multimedia educational environment.



By doing this, the teacher becomes an organizer who designs, initiates, and supports his learners in independent search within the educational computer software.

Since innovations must become the way and style of teachers' work in school, and since responsibility is very high, each teacher must be trained in innovation and the use of innovative work models in the teaching of individual subjects. This means that they need to have a very specific theoretical knowledge and practical skills for programming, introduction to teaching practice, monitoring and evaluation of an innovative work model. This capability implies not only the knowledge of content, i.e. knowledge from the field of expertise in which innovation is carried out using an innovative model of work, but also a very specific methodical knowledge (Bandur, 2007, 8).

Since the teacher as the manager of the teaching process is irreplaceable, just as the computer as a teaching tool is so far "perfect", then it is a solution to combine the advantages that the teacher has, as an individual, with the advantages of modern technology, in the way that better results in teaching of Nature and Society would be achieved.

For a long time, pedagogical science has determined that each student of the individual is himself or herself with his own special specialties, ranging from character, temperament, interest, experience or living conditions. This diversity implies that the student must develop his own learning methods and manage the learning process, which relates to the choice of materials, planning, the pace of learning and the use of modern educational technology.

Namely, in the new concept of education called. Net-generation students, it is not enough to organize the teaching that is focused on the students, it is necessary more than adjusting to different learning styles - it is necessary to leave the students themselves to the "command" of learning. Increasing the autonomy of the students in this regard is the right active, participatory learning, and the role of the teacher is changing to such an extent that the difference between him and the students almost completely disappears (Downes, 2005). It changes the perception of time and with that the need for further modernization of educational technology is more progressive.

In the context of modern educational technology, computer technology and information technology enable students to assume responsibility, control the choice of content in a multimedia environment, evaluate their learning and activity. Computers also allow

learning to continue at any time and any In addition, modern computers provide the possibility of simultaneous use of multimedia sources of knowledge, which, certainly, contributes to a faster and more complete adoption of materials and a lasting memory of the learned.

Accordingly, research has shown that modern technology and the opportunities it provides should be used cautiously and rationally, and that, for example, linking should not completely replace other forms of multimedia such as film, because it has not been shown to be effective in all situations. Namely, it has shown the greatest success in students who already had developed abilities and affection for research tasks, such as tasks requiring a literature review and comparison of data. For students with less abilities, and for other types of tasks, there were significantly more successful tools and methods of learning (Dillon and Gabbard, 1998, 345).

Teaching contents that are presented to students by multimedia content and computers not only modernize nature and society teaching and raise it to a higher level than traditional ones, but also put students into the position of an active participant. Since multimedia software at the same time allows that students independently acquire knowledge, solve problems, tasks, answer questions, search the appropriate databases, simultaneously check the accuracy of the response and, after the operations are done, to correct their mistakes, "empty Odo "excluded continuous feedback that follows each step in the work of student activities (Arsović, 2006, 570).

Educational software provides optimal individualized work, where the speed of learning and promotion largely depends on his abilities, with constant feedback acting motivated.

According to the RS Official Gazette, some of the objectives of the course "From toys to computer" are to train students for the use of educational programs, programs and drawing tools, the use of computers in the game, and so on. Particular attention should be paid to mouse operation and the use of computer for writing text. The focus of work in the third grade should also be oriented towards students' use of computers in teaching and learning ("Official Gazette of RS", 3/2011).

However, with all legal proclamations, students of the first two grades of elementary school are still under-qualified for self-learning using a computer. Teacher can demonstrate certain objects, beings, phenomena and processes through the frontal form of work, using computers or other media carriers. On



this occasion, it should be taken into account that the content is presented with as little text as possible and with the use of images, animated elements, sound effects and movies.

Thus, practitioners make everyday effort to organize learning more flexible in terms of time and environment of teaching, to enrich the teaching materials and make them more interesting for students and that students become a part of teaching process in a greater way and they are motivated and actively building their knowledge according to their abilities and needs and are carried in a way that promotes their overall situations development. In the application of e-learning, students' learning is more dynamic, more independent, more responsible, critical thinking permeated learning. It is evident that e-learning in this regard provides a numerous of the features that ensure the further development of the educational process.

New competencies are expected from the teacher for the organization of the modern teaching characterized by dialogue and interactive access that is supported by e-learning. Effects of its application in teaching are conditioned by the professors' skills to find a large number of Internet content that would contribute to achieving the setted goals, to successfully incorporate e-learning in their teaching, to monitor the progress of students in such learning and evaluates it in the context of the development of students. Also, it is necessary to trains students systematically since the beginning of school to use technology in learning, to foster in students the need for such a form of education and the desire for continuous self-learning and self-processing.

Taking into account the reality in most schools in Serbia and insufficient financial capacity of the state to complete the technical and technological equipment, as well as the value of traditional organizations which continue to lack the e-learning (socio-emotional component of direct interpersonal communication), we see a solution in the model of e-learning, which combines the advantages of both conceptions of teaching (Blended Learning). The teacher by using this mixed model of e-learning, facilitate the transition to self and to the students to new ways of organizing students' learning while retaining the advantages of organizations classical education and supplementing it with e-learning. We believe that in the near future, a joint venture e-learning as a flexible combination of classical teaching, e-learning and distance learning will be dominant system of work in schools. It is in-

evitable that the weather will, in perspective, make teachers to become computer-educated, schools better technical equipped and information and communication tools all the more perfect, that will make e-learning to develop new capabilities and reduces defects related to direct social interaction.

If it is expected from the teacher and the professor to form and educate generations of the future carriers of social change, then they should be enabled more significant than before and the continuous training and development of competencies that are necessary for that kind of work (from the initial education, through the seminars and courses that schools and vocational associations should do more to financing. This, especially as the younger generation, in particular, is extremely interested in the wider use of the various opportunities ICTs in teaching. For now, it turned out that teachers are trained to use innovations in education, but they are not sufficiently trained to apply the advantages of using the Internet in the same (Stošić and Stosić, 2015, 468).

#### **4.4. Advantages and disadvantages of using computers in teaching**

According to research carried out by scientists from the United States, Great Britain and Russia, it can be said that "computer-based lessons are more rational, that students gain more quality, lasting and, in practice, much more applicable knowledge than those acquired in the teaching of traditional (Suzić, 2003, 43). These opinions are prevalent in spite of deficiencies that are also evident, and can be related to the lack of interaction in teaching, the problem of privacy and copy-right (Mantiri, 2014, 590).

The teaching and learning process with the whole group can be simultaneously personalized using computer technology. This means that each student has the opportunity to work - acquires certain skills, skills and abilities, according to his own rhythm and level of engagement. The degree of student's progress will depend on his / her knowledge, activities and computer educational technology.

Given that educational programs are formed by teams of IT and computer experts, it is natural that these programs are better and guarantee a high level of science and motivation, with almost unlimited possibilities of obtaining additional information.

When presenting appropriate educational content, the computer has the technical

and programmatic capabilities for children to simultaneously animate more cognitive senses, thus gaining better performances, concepts and facts.

Unlike traditional-type teaching, here the student is almost never in doubt about whether the problem was properly understood. "Thus, each individual can realistically realize himself, more objectively evaluate his intellectual, character, willingness and all other characteristics of importance for his own progress and development" (Havelka, 2000, 137). This primarily because modern ICT encourages intellectual curiosity of students, his personal approach to the problem solving and individual style of working and thinking (Mitić, 2014, 105).

A student using a computer quickly and efficiently learns the appropriate teaching content, so he has more time to focus on problems and phenomena of particular interest. If it encounters more serious difficulties, it receives adequate instructions from the computer to overcome the problem.

Modern computers have extremely high technical and informational capabilities, with high speed search and processing information. There is also an Internet connection for searching and consulting a variety of databases. With the help of this technology, teachers and students can also try to form their own libraries and repositories of knowledge (articles, photos, materials collected on school trips, excursions, recreational classes ...). Comments of the students always show that students are very interested in this method of teaching work and that the changes in work, like the use of the Internet to gather information, are really good.

The curricula can be active/interactive researched, and students can work independently or collaboratively, in the context of the constructivist approach and achieving inter-integration of the subject. With this approach, it is enabled mastering material according to the individual characteristics of the students (learning styles, so-called personalization of learning). When it comes to hypermedia applications for learning, simulations, it can be used also for individual and cooperative learning. How contents and requirements of this system can be also very complex, it is more recommended to use them for cooperative learning, for mutual exchange and assistance and adequate teachers' feedback-a (Stanković and Stanojević, 2017, 44).

Effective learning with the help of a computer is no longer related to an institution,

a cabinet, a working day, or an hour. An individual can study certain issues at home, on a trip, excursion, regardless of the time and place of his current stay. The computer is not only used to acquire knowledge and learning, but also for a very efficient management of the teaching process.

Despite many of the stated advantages of using computers in education, there are certain weaknesses. There is a problem of difficult programming of certain content-thematic units. It seriously complicates computerized education and continues to focus only on educational or material-cognitive problems to the detriment of the educational dimension, although they constitute an integral component of a unique educational process. Then there are problems of adapting to the needs and abilities of students, as well as an adequate program selection, theme, and modeling (Dillon and Gabbard, 1998, 345).

Since a computer and student communicate in writing, he does not have the ability to hear the lively word of the teacher, which negatively reflects on the enrichment and improvement of his speaking ability. It has completely denied direct verbal communication face to face.

If the goal of teaching and learning is to achieve educational goals and tasks, the teacher is obliged to work on the students in their own example, engagement and behavior. In the process of computer education, there is no such example, a pedagogical model and an ideal that the students can imitate.

The computer gives very reliable feedback, but it can not go into diagnosis - why a particular student is lagging behind in the work, what is blocking him. The teacher, by his personal example and power of character, discovers and develops with the majority of his students the best.

In the end, some researches carried out in the world has shown that educational software often does not correspond to the cognitive, physical and emotional level of children's development, and warns that in their development, care must be taken to avoid damaging children's development (Jones, 2003, 4).

Therefore, teaching in general and consequently the teaching of Nature and Society with the application of information technologies has a number of advantages over traditionally organized teaching. There is no doubt that, in terms of the ability to adapt learning to the individual attributes and abilities of students, the use of diverse sources of knowledge, more successful monitoring and more

objective evaluation, computer teaching is in serious advantage. However, when it comes to affirmation of educational function, acting on students by personal example, knowledge of the emotional, mental and general psychophysical structure of students; setting diagnoses about the causes of mistakes and problems that burden individuals, the possibilities of computers are minor in relation to the power and influence of teachers.

## 5. CONCLUSIONS

Computer era in which we live more and more frequently imposed requirements for modernization and radical changes in the implementation of the teaching process in order to overcome the weaknesses of still dominant traditional teaching. At the time of information technology and general mobility of the society, traditional ways of learning and presenting teaching materials to the students become uninteresting and impractical. In order to increase their motivation, it is necessary for teachers to modernize teaching materials in order to make them more attractive for learning. In this regard, insists on modern teaching, which includes the introduction of the innovative models, and the use of modern teaching aids.

We have seen that from all the subjects in the lower grades of the elementary school, the most appropriate content for the application of the multimedia contents has the subject World around us / Nature and Society. Thanks to interesting, authentic and interdisciplinary content, in teaching this subject, using modern technology, it is allowed active, independent and creative participation of the students in all stages of the learning process.

It is known that teachers as initiators of the change, do not show enough enthusiasm or they fear from the outcome of the use of modern teaching aids, so they very rarely use them in the classroom. This applies not only to simpler technical devices but also to a more modern and more complex computing and computer equipment, which requires a solid IT knowledge. However, despite the many advantages offered by informational technology, the teacher has also released from a portion of the obligation of teaching type, which leaves him more time and energy for creativity and design of the teaching process in teaching nature and society. Therefore, the faster the pace of change in the field of ICT, diversity, and breadth of available scientific knowledge,

obliges all teachers to continuously learn and be in accordance with the time, because of their students and themselves. "Then when teachers accept and open their eyes towards the educational potential of the technology they will come out from irregular, outdated circle of teaching-learning-teaching" (Stanković and Stanojević, 2017, 47).

Namely, in order to raise the quality of teaching to a higher level, it is necessary to change the concept of the work, overcome teaching with the teacher in the "lead role" and turn to more sophisticated strategies for achieving educational tasks.. It is good that the most teachers, in the choice of teaching methods, teaching aids and forms of work, take into account the capabilities of each student. With that is more respected individual differences of the students, and makes it possible for every student to develop at a pace that suits him. The use of computers and educational software in teaching provides a better flow of information since the presentation of information is performed through multiple senses, so students can receive them visually and acoustically. Appropriate use of the modern teaching aids (computers, educational software, etc.) allows students to quickly come up with different information and thus fulfill not only their increased interest in a particular area but also to gain a new knowledge.

The multimedia approach of teaching in general and particularly in the study of integrated content in the teaching of Science and society is one of the most trusted solutions for the modernization of teaching. The use of computers is not just something that is recommended but something that is necessary, since it is the path to the active acquisition of the knowledge and creativity. Through modern informational technology, students learn more by seeing, exploring and solving problems, they encourage them to the mobility and independence, mark the degree of sensory information that indicates things, phenomena, and their characteristics. Multimedia teaching resources, contents, and educational computer software enable students to use a critical source of knowledge to independently learn, analyze, systematize, compare and explore. In this sense, the main goal of this work is to draw attention to the general pedagogical expert and the scientific public and to highlight the wide range of the opportunities that are offered by e-learning in the educational process, and it is already at the level of classroom teaching.

E-learning offers significant opportu-



nities for the teachers to improve the educational process in this regard. If we look at the e-learning in the pedagogical context, it is “interactive or two-way process between the teachers and students, with the help of electronic media, with the emphasis on the learning process, while the media are only adjuvant that completes that process” (Simović and Čukanović-Karavidić, 2010, 762). According to one of the most common definitions “e-learning means any form of education in which educational content is delivered in electronic form (Fallon, Brown, 2003, according to Petrović, 2009, 265). In the context of teaching situations, application of the media is broadcasting educational content through the interconnected interactive media and it provides different methods and forms of learning.

The fact that the use of ICT is the imperative of modern teaching, it can also be seen in the [Strategy for Development of Information Society in Serbia \(2010, 13\)](#). Although didactics continuously gives his theoretical contribution in this regard (cybernetic didactics, developmental and constructivist approach to learning), methodological (practical) implementation is not nearly at a satisfactory level. The needs for innovative projects in education are distinctive because there is a large gap between scientific-technical achievements and the needs of labor, on the one hand, and the quality of the educational process, on the other (Novković Cvetković, Stanojević, 2017, 54).

Therefore, at the present time, the teaching process is almost unthinkable without the use of the Internet and educational computer software. ORS includes programming languages, software tools, a certain organization of teaching and learning, and contains a variety of educational programs that are intended for students of different ages, based on logic and pedagogy (Nadrljanski and Nadrljanski 2008, 169). Educational software explicitly represents various strategies and teaching techniques that are specified by author and they allow their controlled application with the aim of adopting more productive content that the student, by using the system, needs to overcome. The main role of educational software, as modern interactive media is to enable, create prerequisites accelerate them: the process of students’ learning; understanding of educational content; activity of the students in the learning process; mastering the learning process at all levels, starting from the knowledge of the basic facts about the processes, phenomena and events, through their understanding through thought-processing, to the

practical application of knowledge.

The most important value of the educational software is that with its help can be achieved a multimedia approach to teaching. There are many features of multimedia applications, represented in educational software, that enhance the educational process: visual presentation of skills; a broad base of available knowledge; indices; researching (students are researchers that with the help of “guides”, “tour”, etc., which are orientation in mastering the material, get to needed information); students’ individual style (emphasis on internal insight, discovery, exploration, conceptual knowledge and understanding of mutual relations); simulation (except for navigational interaction, students can use simulation, various intellectual tools, playing games, such as “what if” type material “Why-so” and similarly); realization of communication networks, through which group simulations can be realized, to create opportunities for discussion and exchange of opinions, reviews, information. (Stanojević et al., 2017, 188).

E-learning under conditions of existence abundance of the electronic resources of the teaching materials and in conditions of different shaping this material through the new teaching technology, it can be relatively easy to use in teaching work. The key is motivation and creativity of the teacher with adequate ICT competence in at least the minimum technical and technological conditions (they are constantly being improved, but they also regularly serve as a pronunciation) and with the basic informatics literacy of the students (which in turn is responsible the teacher because students and parents often favor an optional subject From the toy to the computer if it is on the teacher’s offer). It is understood that the teacher thorough knows planned courses that should be realized and based on them trials and adjusts contents available in electronic form for the implementation of e-learning in their teaching. ICT more competent teachers are increasingly engaging in designing their own database of electronic materials or websites dedicated to the students or colleagues. Increasing the volume of these resources and the expansion of choice contributes to the increasing popularization of e-learning among the teachers. More and more exchanges of experiences about the implementation of e-learning at all levels of communication and relations of teaching: teacher-teacher, student-student, and teacher-student, which opens new horizons in the innovation of teaching through modern technologies.



So, using educational materials in electronic form, in teaching has not only given a chance to the new pedagogical paradigms, but it imposes a new form of professional cooperation between the teachers themselves. The need and desire to design a material that is suitable for digital presentation, for each subject and for all generations, will displace individual authors and replace them with the creative groups. Once created electronic educational content is easily adjusted and upgraded in regards to the classic textbook (Writing scratch and by individuals). The ability of such a project is being built by the simultaneous development of a didactic-methodical and ICT competence of the teachers and competence of wider pedagogical repertoire (Stanojević et al., 2017, 189).

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The authors declare no conflict of interest.

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# COGNITIVE THEORIES AND PARADIGMATIC RESEARCH POSTS IN THE FUNCTION OF MULTIMEDIA TEACHING AND LEARNING

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## ABSTRACT

At present it is almost impossible to imagine formal and non-formal education without the use of computers and information and communication technology (ICT), and we can rightly say that modern education is increasingly taking place in a multimedia environment and relying on multimedia teaching and learning. In fact, multimedia with its existence and progress continually poses new challenges to educational technology, but also to the teaching process itself. As a result, classical traditional learning and teaching leaves classrooms, while parallel to that, multimedia becomes an unavoidable segment in the process of acquiring knowledge. The multimedia display provides a better understanding and understanding of teaching content that can be presented in many ways, and which gives a higher educational value. The focus of work is the importance and contribution of the theory of multimedia learning with a focus on activating cognition among students, as well as an analysis of the effectiveness of the use of media in teaching. Also, a special emphasis in the work is focused on the analysis of qualitative and quantitative research methods and techniques for examining the role, significance and efficiency of multimedia teaching and learning in the educational process.

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## 1. INTRODUCTION

Individualization, based on modern educational technology, is one of the models of the solution to the exit from the current crisis of the educational system. It requires individual contacts, taking into account all segments of individual differences, because in its application there are no ready templates and recipes, since each student is an individual for himself. It applies when the work is adapted to the individual or when a work type that is adapted to suit the needs, desires and way of thinking

of individuals participating in it is applied. A key segment, a form for successful implementation of modern teaching and school reform, lies in a winning combination, the essence of which is reflected in the correlative relationship and the achievements of pedagogical and psychological disciplines (didactics, methodologies, modern educational technologies, and especially pedagogical psychology).

Theories and models studying the cognitive learning possibilities of multimedia are relevant: communication theory, information theory, cognitive theory of multimedia learning, cognitive load theory, multiple intelligence theory, structuralism of the Berlin school, an integrated model of text and image understanding and a structural model of teaching. All of these theories relate to cognitive learning opportunities, the conditions in which learners and teachers learn, as well as on the results that various multimedia accomplish with students in the transfer of information.

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## 2. THEORY ORIENTATION – COGNITIVE LEARNING THEORIES

Teaching content should be available to students in such a way as to maximize meaningful learning. Understanding content does not only require understanding the key concepts of learning, but also the establishment of meaningful links to bring these concepts into a coherent whole with the knowledge that already exists in the learner's consciousness, their cognition. We are witnessing the occurrence of big changes in our educational system in the form of a conflict of the traditional approach to learning and new ideas. It is absolutely necessary to find the best solution for all new needs that have emerged as a result of the rapid development of science and technology. It is quite a question of how best to transfer this knowledge to pupils and to what extent they are able to adopt and apply it both in school and in everyday life (Stanković, 2017).

The theory, specifically concerned with cognitive development is Piaget's theory, and its impact on the educational process of children in the past decades has been enormous. Piaget's theory, in essence, is biologists because it claims that the basic cognitive structures, the so-called schemes and operations, innate patterns, and development consist in adapting these structures to the requirements of the environment through the processes of assimilation and accommodation. Schemes are internal representations of certain specific actions or behaviors that are present at birth, while operations are much more complex than internal cognitive rules. Schemes are internal representations of certain specific actions or behaviors that are present at birth, while operations are much more complex than internal cognitive rules. Assimilation is a customization of experience or subject to already existing strategies or concepts, while accommodating changes in existing strategies in response to new experiences or information. The balance between the process of assimilation and accommodation ensures the process of balancing, that is, the pursuit of equilibrium, which, according to Piaget (1971), is a general biological principle.

Russian psychologist Vigotski (1977) decides that pedagogy must be oriented to the future, not to the past of child development, because learning is only valid when it precedes development, since it initiates a whole range of mature functions that are in the "next

development zone". The advocates of the theoretical foundations of Vigotsky (Leontiev, Galjperin, Zaporozhek, Repkina, Eljkonjin, Davidov, etc.) proved in their research that the significantly changed teaching in relation to the existing (especially in the domain of content) positively affects the overall success in the department, but and each student separately, in the field of thought, as well as qualitative and quantitative knowledge. In order to create new cognitive ability in children, different conditions need to be met. First of all, the child should actively participate in the learning process and establish interaction with the adult who teaches. It is desirable to form a joint activity, which may be in the form of a task that is solved and which should be in the "next development zone", i.e. should be such that it requires the abilities and structures that belong to the next stage of the cognitive development of a child. An adult who teaches a child must gradually take control of the strategies they have jointly formed and enable the internalisation process.

In the process of solving a particular problem, going through the phases: preparation, incubation, illumination, verification, the individual needs to identify the inner ties and to understand the mutual dependence of the problem situation and its constituents in order to arrive at an adequate solution. According to gestalt theory, teaching materials should be structured so as to encourage students to transfer information presented in teaching content to a wider circle of different situations, to critically assess the truthfulness of facts outlined and to develop the creative-research methodology. Knowledge gained by insight has significant advantages over knowledge acquired through learning, and teaching materials must contain tasks that would be solved by insight. Bearing in mind the fact that the success of this type of learning is conditioned by the individual characteristics of students (earlier experience, skills and transfer power), teaching materials must be adapted to the individual needs of students.

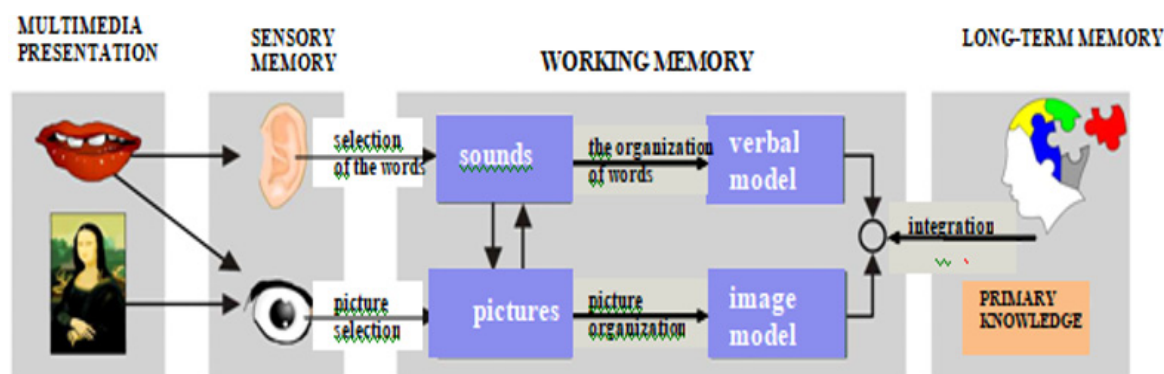
These psychological basics are very important for modeling teaching (individualization, programmed, problem teaching, differentiated - teaching at a higher level of complexity, etc.). In that sense we can say that in these psychological bases lies the didactic-methodical and pedagogical character of teaching and learning a child. In contemporary didactics and methodology, the demands for teaching that will express the research character are increasingly emphasized as one of the

solutions for successfully overcoming didactic materialism. This is due to the weakness of classical teaching, which primarily requires the overcoming of a very extensive factual material, while at the same time neglecting the practical application of the learned and intellectual development of the individual.

*The cognitive theory of multimedia learning* evolved from the theory of information processing at the end of the sixties of the 20<sup>th</sup> century. The information processing theory is a simple and general learning model that consists of: irritation, attention, information retrieval and storage. *In multimedia learning*, when it comes to storing and archiving data and information, *three memory functions* are active: *sensory memory*, *working* and *long-term memory*. Words and images from the outside world, represented by a multimedia presentation, through the senses of hearing and sight, enter sensory memory. The main action of multimedia learning takes place in a working memory that temporarily retains this memory and manages knowledge in the active consciousness (Sweller and Chandler, 1991). The left part of the working memory shows the

raw materials that enter into working memory. The arrow from the sound to the image shows the mental conversion of sound to the visual image, while the arrow from the image to the sound represents a mental conversion of the visual image to sound. The cognitive theory of multimedia learning is based on a model that makes selection, organization and interaction of information through: selection of important words for processing in verbal memory, selection of important images for processing in the visual memory, organization of selected words in the verbal thinking model, organization of thought images in visual thinking model and the integration of verbal and thought presentations with previous knowledge. The cognitive theory of multimedia learning is based on the audiovisual learning model (Figure 1).

Technologically focused approach in focus has the technological functionality of a successful multimedia message transmission. With this approach, the main question is how to achieve a successful transfer of multimedia content to a recipient, where it seeks to make more efficient use of multimedia content technology.

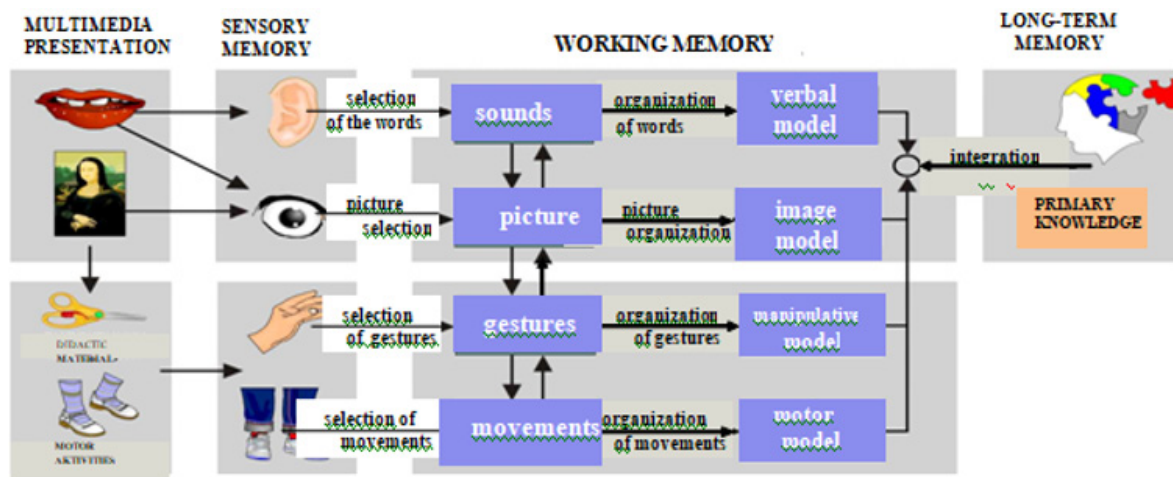


**Figure 1.** Cognitive model of multimedia learning (according to Hilčenko, 2012: 309)

The main cognitive process of multimedia learning is represented by arrows that indicate word selection, image selection, word organization, image organization, and their integration. These five cognitive elements of the process, facilitate learning through the procedure of small segments: select words and images from the first spoken sentence or the first few seconds of animation, organize and integrate them, and then repeat the procedure on a new case. Thus, by multimedia presentation of words and images, sound and iconic images from sensory memory are transformed into sounds and images in working memory, creating a verbal and image model in working memory, connecting them with previously

acquired knowledge from long-term memory. It's common to say that one image is worth more than a thousand words. However, we realized that one animation is worth more than a thousand images, because a thousand pictures, displayed at high speed in a series, represent a vivid picture: film, video, animation, illusion. If this animation is accompanied by speech (sound), we achieve an incomparable effect on learning. If we offer pupils with animation, supplemented by speech (sound) and the possibility of direct, practical work, manipulation, the results of such (obvious) teaching are incomparable (Figure 2). Knowledge suggests that the practice has confirmed these experiences.





**Figure 2.** Cognitive model of multimedia learning complemented by manipulative-motor learning (according to Hilčenko, 2012: 310)

Comparatively, Mayer (2011) shows the learning with auditive, visual and audio-visual methods and lists three types of information processing: image processing, processing of spoken words and processing of printed words. It also draws attention to the respect of the general principles of multimedia teaching, which results in a better quality of learning, which should be followed in the phase of creating multimedia teaching content.

These are the following principles - *Multimedia principle*: students learn better through words and images, but only using words; *The principle of spatial constraints* - students learn better when the corresponding words and images are presented closer to one another than when they are on the paper or on the screen one further; *The principle of time constraints* - students learn better when words and images are presented at the same time, but when they are presented successively; *Principle of coherence* - learners learn better when irrelevant words, images and sounds are excluded, but when they are involved; *Principle of modality* - students learn better through animation followed by speech, but through animations and text on the screen; *Principle of Excellence* - learners learn best from animations followed by speech, but through animations, descriptions and text on the screen; *The principle of individual differences* - the effects of the message design process are stronger for pupils of lesser knowledge, but for those with higher knowledge and for free learners (extrovert), unlike those less free (introvert).

Majer (2009) also gives another more complete model, based on the following specific principles, which in contrast to the above mentioned, have more the character of the me-

thodical instruction in the phase of applying the multimedia teaching approach: *Multimedia Principle* - a combination of text with text-related images when students have modest prior knowledge, but sufficient cognitive ability to process both text and images; *The principle of spatial contact* - if the written text is used, it is interpreted in the spatial vicinity of the image; *Time-sharing principle* - if the text is used, it is interpreted with a picture in time closeness; *Principle of modality* - if animation is used, it is better to use spoken text instead of written; *The principle of specific redundancy* - we do not add written text to speech while combining it with the image, because the duplication is unnecessary; *Principle of coherence* - we do not use irrelevant or incomprehensible (foreign) words and images, and do not add unnecessary sounds or music; *The principle of sequencing the image-text* - if the written text and the image cannot be presented at the same time, then it is better to interpret the picture before the text, but vice versa; *The principle of structural display* - if the content can be visualized by different images in different ways, that they are information equivalent, we use an image with visualisation that best suits the adoption of future teaching topics; *The principle of general overcrowding* - we do not combine text and image if a student has a higher knowledge and cognitive ability to create a mental model from one source of information; *The principle of information processing control* - if the static image is combined with text, if the text is difficult to understand and learning time is not limited, then we prefer to use the written text rather than spoken.

Should not forget Skinner's contribution when it comes to cognitive learning theory. In



the frontal form of work, learning is informative, most often from teachers to students, and vice versa very rarely. The most productive is the teaching process that is organized as a permanent two-way communication from the knowledge source (teacher, textbook, teaching material...) to students and also in the reverse direction from pupils to teachers who gets information on whether they are and in which custom learners have adopted teaching content. The solution to this problem is safe in the programmed teaching. The basic principles of programs teaching can be described through the following principles: *The principle of small stages* - a feature of gradualness and system; *Principle of active participation* - this principle is difficult to achieve in traditional teaching, while inactivity is impossible in programming teaching; The principle of direct verification - realized only in programming teaching; *The principle of individual rhythm* where everyone progresses in accordance with their abilities, efforts, perseverance and pre-knowledge (Blagojević, 2012).

In multimedia learning and educational practice, programmed teaching has influenced positively to raising the general level of knowledge.

All of the aforementioned principles of special importance because they can serve as postulates in the creation and creation of educational software. With their respect, they create preconditions that, when applied in the teaching process, they are reasonably expected and provide qualitative and quantitative positive progress in the individualized learning process and the adoption of new teaching contents.

A modern teaching organization is unimaginable without introducing innovations. The didactic-methodical reform in teaching and learning implies the use of new didactic materials and teaching strategies. A multimedia approach in teaching does not change only the method and mode of work, but certainly the quality of knowledge (Stanković and Dimić, 2016).

Every day, novelties in science are being created. The scope of knowledge is increasing, and this knowledge needs to be internalized by both teachers and students. All this points to the need for continuous learning and improvement.

To conclude, multimedia technologies allow a new approach to teaching content and learning. Thanks to the large increase in application in education, today's students have the choice of fast and functional learning.

On the other hand, from the teacher's position "...If you do not have fun in this profession, you are not a good teacher" (Matasić and Dumić, 2012: 149). In order for the teacher to feel satisfaction in his classroom, based on the foregoing, it is quite clear that the teacher must be competent in the use of multimedia, to know the benefits of multimedia learning, but also to possess methodological-didactic and pedagogical-psychological knowledge.

### 3. POSTULATES OF RESEARCH PARADIGMS AND MULTIMEDIA LEARNING

In what do we identify the postulates of research paradigms in the study of multimedia learning?

Quantitative research is a research carried out in social sciences, relying on probability theory and statistics, the results obtained in the sample of respondents apply to the entire population. The aim of the research may be to describe the condition or to determine the cause-effect relationship between the individual components. This research group includes experiments, as well as field surveys. It starts from clearly defined, pre-set hypotheses that are tested by statistical analysis. The main goal is to verify theories and hypotheses, to detect causal relationships. The main goal is to verify theories and hypotheses, to detect causal relationships. This research is not carried out under natural conditions, but by isolating variables, by controlling external influences that can be accessed exclusively empirically.

The quantitative methodology starts from the assumption that there is only one truth, which is independent of the environment and the individual, and which can be quantified and subject to measurement. The researcher must not exert any influence on the subject and flow of the research, on the course of the research, on the respondents, and finally on the analysis and interpretation of the results. The most specific feature of the quantitative methodology is the position of the researchers in quantitative research because it seeks to separate from the subject of research, to be isolated in order to avoid bias in the research (Cohen, Menion and Morrison, 2007; Fajgelj, 2010; Kožuh and Maksimović, 2011).

Unlike a positivistic approach that seeks objective knowledge and explores phenomena which it believes to possess its "objective" image independent of the observer's view, a qualitative approach examines phenomena in

their natural surroundings, trying to understand them in relation to the meanings attributed to them by the participants themselves, because it is based on the assumption that subjective truth is the only thing that exists. Qualitative research in social-humanistic sciences is very close to the postmodernist approach to a scientific theory and methodology that has an explicitly interpretative dimension, followed by scientific skepticism and the re-examination of traditional positivistic epistemological positions (Brayman, 1988; Howe, 1988; Kožuh and Maksimović, 2011).

## 4. DISCUSSION

Would all media present today be present that they were not tried on hundreds of units or respondents? Each media that were present first was empirically tested by the testing technique, and then implemented in practice. These facts imply stability the postulate of quantitative research in the study of multimedia learning in education.

Furthermore, all the above mentioned theories, created by observing certain observations using observation protocols, anecdotal notes... It should not be ignored that these are all features of a qualitative methodology. Would all this be possible without the well-known paradigmatic basis qualitative and quantitative methodology, inductive and deductive procedures?

**Table 1.** Comparative overview of the characteristics and impacts of quantitative and qualitative methodology on multimedia teaching and learning

<i>Quantitative researches</i>	<i>Qualitative researches</i>
Clear questions (defined problems)	The world is not uniform
Rationally derived hypothesis	Hypotheses are not made before collecting data
Fully developed research procedures	Flexible research procedure
Control of external factors	Observing the research process
A large enough sample	Small sample
Analysis and interpretation are quantitative	Analysis and interpretation are descriptive
Processing of data based on the application of statistical procedures	Statistical procedures are rarely used
<b><i>Multimedia teaching and learning</i></b>	
Experimental researches	
Causal-comparative researches	
Descriptive researches	
Correlational research	
Historical research	
Mixed method research	

To summarize, the features, characteristics, the postulate of qualitative and quantitative research paradigms are numerous and there are many sources that can be studied. When we think that the war paradigm was long overdue, we see that this topic is still very actual in the last two decade (Creswell, 2014; Este, Sitter and Maclaurin, 2009; Freshwater and Cahill, 2013; Guba and Lincoln, 2005; Morgan, 2007; McGregor and Murnane, 2010; Mertens, 2010; Milas, 2005)...

Table 1 shows the basic characteristics of the quantitative methodology, which include: the set problem and subject of the research, the clearly set goals of the research, the setting of tasks and the hypothesis of the research, the clearly elaborated research procedure (methods, techniques and research instruments), large sample and statistical data processing. Qualitative research is the opposite of them and imply the uniqueness of studying the research problem, the individual approach to the study of the research problem, the hypotheses do not arise, the theory comes with detailed analysis and descriptions of what is being studied and does not imply statistical data processing.

When it comes to multimedia learning, they can be studied using different research paradigms (Mateljan et al., 2007; Nikolova, 2002; Petrović, 2016; Plass and Jones, 2005; Sholsh, 2012; Tomić et al., 2016) discuss the problems of multimedia learning in the educational process through various research paradigms and applying different kinds of research: experimental, comparative, correlation, descriptive, historical research. In addition, multimedia learning can be studied using mixed methods that have qualities in themselves and qualitative and quantitative methodologies. It is important to point out that these researches are just an example of the evidence of the application of different methodological apparatus in the study, the principles of designing educational multimedia learning, the study of multimedia learning in mathematics, grammar, language learning, e-learning, modeling of active teaching using multimedia and etc. It is obvious that multimedia are widespread in different scientific disciplines and fields, and the results of the research are presented in different ways (qualitatively and quantitatively) with the above characteristics of the research paradigms (shown in Table 1).

In order to better examine its subject, the task of pedagogy with its numerous disciplines is to carry out numerous research, respond to existing questions, but also ask new questions,

thus enriching knowledge of its subject, and developing itself and raising it to a higher scientific level, all based on its multidisciplinary scientific character.

## 5. CONCLUSION

Each research method used in the field of education is based on principles and rules that are narrower and broader in terms of practice. These didactic model are elaborated through principles where we can absolutely say that it has the research principle of induction and deduction. With their respect, preconditions have been created that, when applied in the teaching process, they are expected to provide qualitative and quantitative positive progress in the individualized learning process and adopting new teaching contents.

Projects for the production of high-quality educational multimedia content, requires a multidisciplinary team of experts, methodologists, psychologists, pedagogues, practitioners.

Implementation of multimedia in the teaching process leads to an increase in the active participation of students on time, facilitating interactive learning and improving success. Practice shows that multimedia has its place in our teaching, but for effective integration it is necessary to develop teaching materials in which beginner learners can quickly identify the primary goals of teaching. Information must be presented with clear explanations and there must be the possibility of learning / exercising skills and knowledge with feedback. With new empirical findings, we can always determine their suitability for implementation in our educational system. Empirical findings and implementation of something new is not possible without the use of qualitative and quantitative research.

The possibility of using multimedia as a functional integration of individual media allows to develop in a new way a methodology suitable for the training of students and to implement new and varied methods in the teaching process. Everything can be a contribution to the research of teaching methods for multimedia learning using techniques and instruments of qualitative and quantitative methodology.

### Conflict of interests

The authors declare no conflict of interest.

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International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE) would like to acknowledge the following reviewers for their assistance with peer review of manuscripts for issues in 2017. Their comments and suggestions were of great help to the authors in improving the quality of their papers. Each of the reviewers listed below returned at least one review for these issues.

Thank you Reviewers!!!

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8th GVVU's WWW User Survey. (Od). Retrieved August 8, 2000, from [http://www.cc.gatech.edu/gvu/user\\_surveys/survey-1997-10/](http://www.cc.gatech.edu/gvu/user_surveys/survey-1997-10/)

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Cuter, LD, Frölich, B., & Hanrahan, P. (1997, January 16). Twohanded direct manipulation on the responsive workbench. Paper presented at the 1997 Symposium on Interactive 3D Graphics. Abstract retrieved June 12, 2000, from <http://www.graphics.standard.edu/papers/twohanded/>

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Miller, M. E. (1993). *The Interactive Tester (Version 4.0)* [Computer software]. Westminster, CA: Psytek Sesvice.

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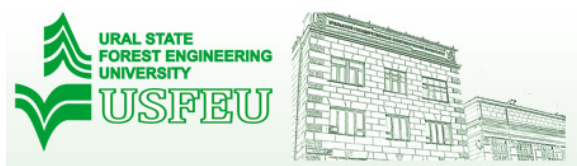
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